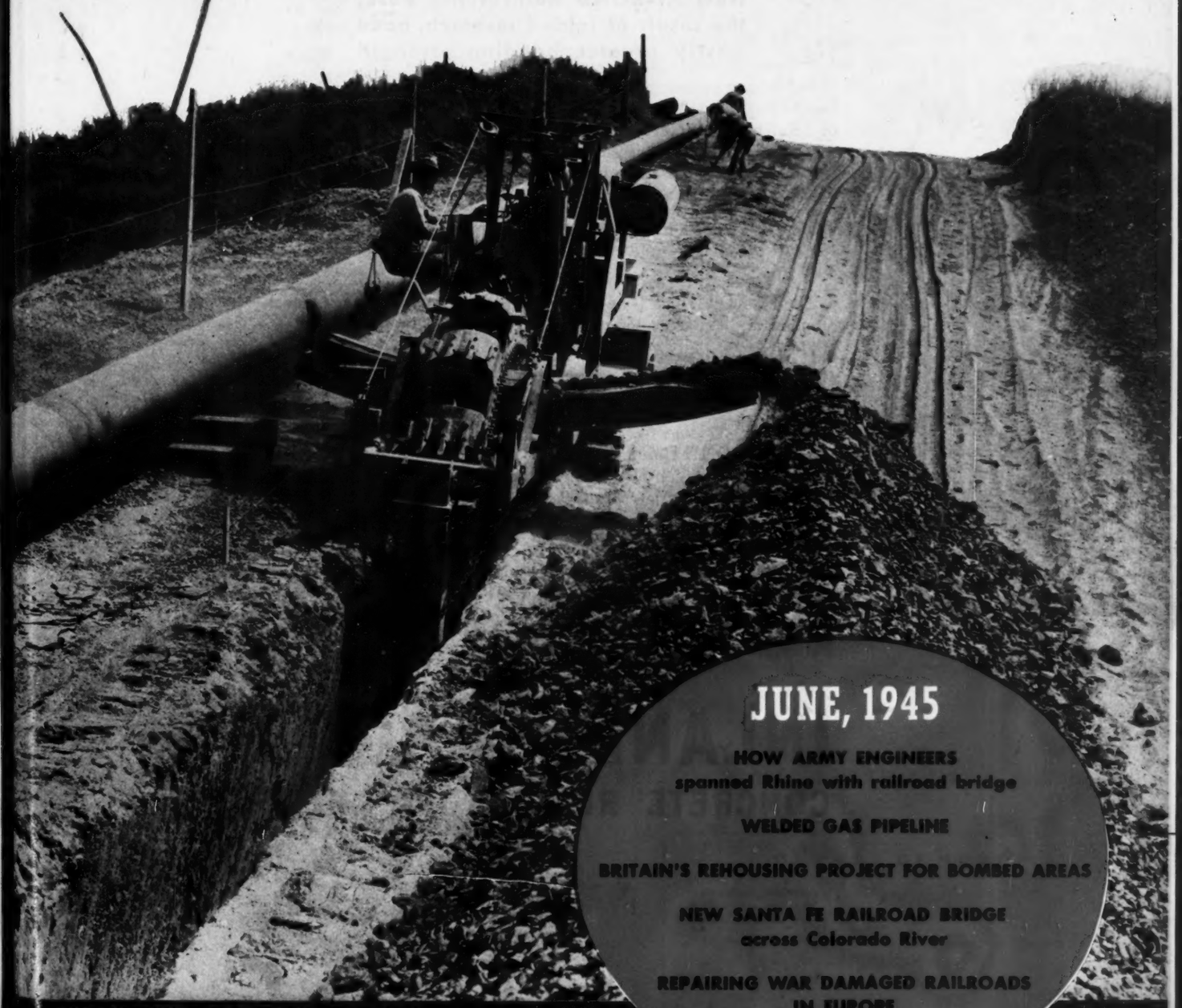
TECHNOLOGY DEPT

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

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TRENCH EXCAVATOR, working uphill, prepares for laying of 18-in. diameter natural gas pipe line in California.

JUNE, 1945

HOW ARMY ENGINEERS
spanned Rhine with railroad bridge

WELDED GAS PIPELINE

BRITAIN'S REHOUSING PROJECT FOR BOMBED AREAS

NEW SANTA FE RAILROAD BRIDGE
across Colorado River

REPAIRING WAR DAMAGED RAILROADS
IN EUROPE

A Major Re-Bar Improvement ... the first in 30 years!

New HI-BOND Reinforcing Bars, the result of Inland research, have vastly greater bonding strength

Inland engineers, thoroughly experienced in the design and erection of reinforced concrete structures, have known that owners and architects have long desired a better reinforcing bar—a reinforcing bar of greatly increased bond value—a bar that would result in more efficient structures and lower construction costs.

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Inland Steel Company, 38 South Dearborn Street, Chicago 3, Illinois. *Sales Offices:* Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

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INLAND HI-BOND
CONCRETE REINFORCING BARS

CURRENT JOBS
. . . and Who's Doing Them

BUILDINGS

Public—Navy contract for ordnance plant at McAlester, Okla., was awarded to **J. A. Terteling & Sons, Inc.**, of Boise, Ida., for $7,300,430. **Redfern Construction Co., Ltd.**, of Toronto, Ont., has $4,200,000 contract for military hospital. **Jas. Stewart Corp.**, of Houston, Tex., will build hospital for $3,347,304. Contract for $2,250,000 factory at Chattanooga, Tenn., went to **Clemmer Construction Co.** of Akron Ohio. Navy contract for housing units in Florida went to **Fred Howland, Inc.**, of Miami, for $2,300,000. **MacDonald Building Co.**, of Tacoma, Wash., submitted low bid of $2,059,827 for buildings at American Lake. Hospital buildings at Halifax, N. S., will be built by **E.G.M. Cape & Co.**, of Montreal, Que., for $2,000,000. **Gilbans Building Co., Inc.**, of Providence, R. I., has $2,000,000 contract for plant at West Haven, Conn. Navy contract for $1,609,513 for storehouses at Torrance, Calif., went to **P. J. Walker Co.**, of Los Angeles. **Beers Construction Co.**, of Atlanta, Ga., will build $1,474,745 hospital at Dublin. Low bid of $1,470,500 was received from **Haris Construction Corp., of Brooklyn, N. Y.**, for dwellings at Anacostia, D. C. **Gust K. Newburgh Construction Co.**, of Chicago, Ill., has $4,467,900 contract for hospital at Tomah, Wis. Army contract for barracks at Portland, Ore., went to **Timber Structures, Inc.**, of Portland, for $1,050,000. **V. P. Loftis**, of Charlotte, N. C., has $1,008,897 Navy contract for magazines at Charleston, S. C.

Industrial—Contract for plant at Moundsville, W. Va., went to **Geo. A. Fuller Corp.**, of New York, N. Y., for $6,000,000. **Pigott Construction Co., Ltd.**, of Hamilton, Ont., has $1,500,000 contract for plant at Aylmer. Malting plant at Transcona, Man., will be built by **Commonwealth Construction Co., Ltd.**, of Winnipeg, for $1,000,000.

HEAVY CONSTRUCTION

Railroad facilities at East Pittsburgh, Pa., will be built by **McCrady-Rodgers Construction Co.**, of Pittsburgh, and **American Bridge Co.**, of Ambridge, for $2,450,000. Marginal wharf at Stockton, Calif., will be built by **MacDonald & Kahn, Inc., G. Pollock** and **Teichert & Son, Inc.**, of San Francisco. **Harmon Construction Co.**, of Oklahoma City, Okla., has $1,032,214 contract for filter plant. Low bid of $939,365 was submitted by **Macco Construction Co.** and **Morrison-Knudsen, Inc.**, of San Francisco, for airfield paving at Mills Field.

HIGHWAYS

Among recent highway contract awards are the following: Georgia $385,601 to **W. L. Cobb, Inc.**, of Decatur, Illinois; $302,916 to **Collins Construction Co.**, of Decatur; $232,172 to **I. D. Lain Co.**, of Springfield; $269,125 to **White Consolidated, Inc.**, of Chicago; $210,394 to **Standard Paving Co.**, of Chicago; and $205,688 to **Granite Bituminous Paving Co.**, of St. Louis, Mo. Missouri: $215,730 to **Koss Construction Co.**, of Des Moines, Ia.; and $258,640 to **Payne & Dolan, Inc.**, of Chicago, Ill. Nebraska: $268,238 to **Northwestern Engineering Co.**, of Rapid City, S.D. New Mexico: $322,458 to **J. E. Skousen**, of Albuquerque. New York: $583,323 to **Warren Bros. Road Co.**, of Boston, Mass.; and $208,375 to **Fichter Steel Corp.**, of New York. Pennsylvania: $188,063 to **The Baldwin Brothers Paving Co.**, of Cleveland, Ohio. Tennessee: $744,914 to **Wright Contracting Co.**, of Columbus, Ga.; and $497,303 to **H. E. Wolfe Construction Co.** and **J. B. Michael**, of St. Augustine, Fla. Texas: $345,749 to **Russ Mitchell, Inc.**, of Houston; $216,344 to **E. Loyd**, of Fort Worth; and $280,302 to **E. B. Darby & Co.**, of Pharr. Virginia: $1,000,000 to **Baltimore Contractors**, of Baltimore, Md.; $498,691 to **Short & Thompson, Inc.**, of Hopewell; $358,631 to **F. D. Cline**, of Greensboro, N.C.; $265,602 to **J. R. Ford Co., Inc.**, of Lynchburg; and $223,090 to **W. M. McIntosh, Inc.**, of Richmond.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

A. E. PAXTON, Publisher
ROBERT K. TOMLIN, Editor

Editorial Staff: Vincent B. Smith; Paul Wooton and A. N. Carter (Washington) N. A. Bowers (San Francisco) Nelle Fitzgerald Patricia McGerr

JUNE, 1945

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **LONG-REACH TRAVELER** placed 100-ft. I-beams in Army bridges in Europe —p. 55

How **BRITAIN'S RE-HOUSING PROJECT** will provide emergency shelter for bombed-out home owners —p. 58

How **PREFABRICATED PLUMBING UNIT** was installed in emergency hut —p. 60

How **ALUMINUM HOUSE**, prefabricated in four section, was erected at site —p. 61

How **CANVAS-COVERED HANGAR** with steel trusses was erected by Army Engineers on Saipan —p. 62

How **CONTRACTOR-BUILT EQUIPMENT** facilitated construction of 90-mile welded gas pipeline —p. 64

How **PIPELINE SECTION** 420-ft. long crosses deep canyon with no external means of support —p.65

How **RHINE RAILROAD BRIDGE** was built by Army Engineers at Wesel in 10¼ days —p. 68

How **CAST-IRON PIPE** was unloaded with earth-moving tractor equipment —p. 72

How **WAR-DAMAGED RAILROADS** were reconstructed in Europe by Army Engineers —p. 74

How **TRACTOR-MOUNTED SPREADER** placed bituminous widening strip —p. 78

How **PNEUMATIC PIER** 123-ft. deep was sunk to support deck trusses of Colorado River bridge —p. 80

How **TIME STUDY** suggested ways to save $800 on $5,000 operation —p. 84

How **ROLLED CONCRETE PAVEMENT** was used on hangar apron and runway shoulders —p. 88

How **BRIDGE SPANS** were salvaged, moved upstream and re-erected by TVA —p. 92

How **SELF-PROPELLED EARTH MOVERS** were used for heavy grading in soft ground —p. 94

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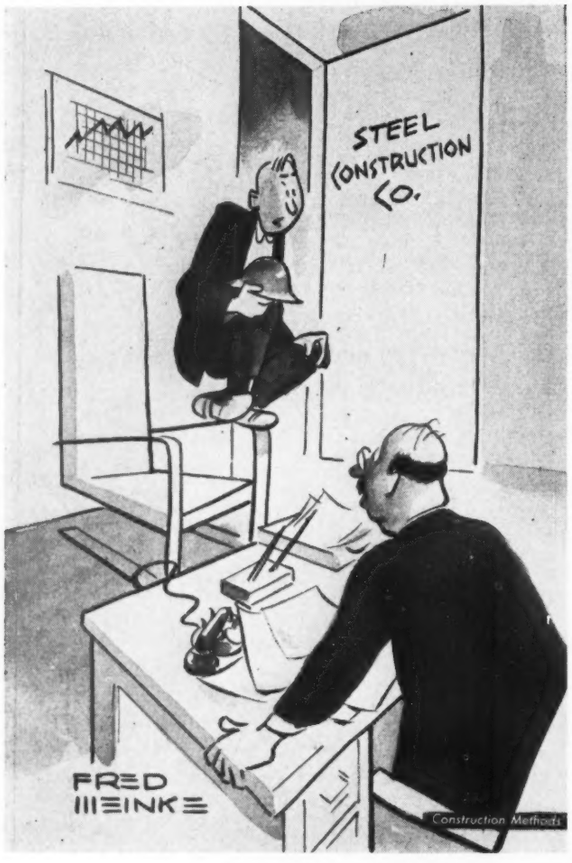
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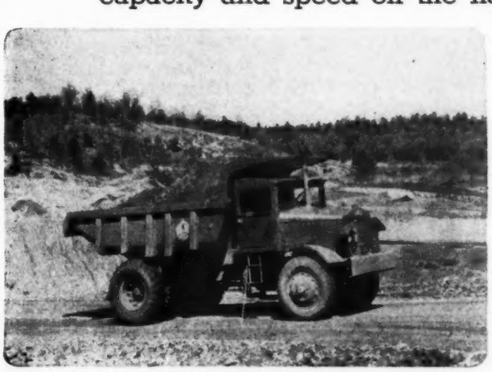
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In war or peace
B.F.Goodrich
FIRST IN RUBBER



Severe shrapnel wound

TIRES often have a short life at the battlefront. Machine gun fire and shrapnel riddle tires with holes. Rough usage tears casings and tubes to pieces.

Before the war it used to be common practice to throw badly damaged tires on the scrap heap. Then B. F. Goodrich men worked out improved methods for repairing large size tires with holes as big as your fist. First they clean around the injury with a special power-driven tool — just as a dentist cleans the cavity in a tooth. In the picture you see the careful preparation made for repairing.

Plies of new cord material are added to the inside of the tire to replace the broken plies which were removed. New rubber is anchored to the outside, and the tread built up to the original surface. Then the entire repair is vulcanized into the body of the tire under high pressure and controlled temperature. After vulcanizing the tire is ready to go back into service with the repaired section practically as strong as the rest of the tire.

Many thousands of tires have been repaired by this method both by Army men and by B. F. Goodrich men. Thousands of tons of critical materials have been saved from the scrap heap.

You can make your off-the-road tires provide many extra hours of service by giving them proper care and by having them repaired by factory methods when necessary. Repair methods used by B. F. Goodrich were developed in the Akron factory and proved in actual service. Equipment and standardized methods were then installed in convenient locations all over the country. No matter where you operate, there is a B. F. Goodrich dealer and he will see that they are quickly repaired—by factory methods. *The B. F. Goodrich Company, Akron, Ohio.*

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IN GETTING MORE WORK DONE—FASTER, CHEAPER!



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Super heavy duty—84 pound—extra powerful—for tough, rough going under all conditions—A rugged, four-bolt back head, Thor positive, short-travel, tubular valve and new Thor latch-type retainer (all exclusive features) are standout reasons why Thor Breakers turn out fast, low cost high efficiency work so consistently.

For complete information about powerful, easy-operating Thor contractors' air tools, write for Catalog 42-A.

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Short-travel of the Thor valve creates a positive valve action that admits only the required amount of air—then instantly seals the inlet against excess air. Elimination of excess air avoids power overload that staggers the stroke and causes vibration.

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GETTING THE MOST OUT OF A BULLDOZER

CARVING airstrips out of jungles and dozens of equally difficult assignments have proved how expert the Seabees are in getting the most out of a bulldozer. Here, on an "easy" job, one of them builds a causeway to enable the crew of an LST to unload supplies.

On a Pacific island or here at home, getting the most out of bulldozers—and other types of construction equipment—depends not only on the operator's skill but also on effective lubrication. Maintenance-wise contractors everywhere know effective lubrication is always assured when they use Texaco.

Texaco Ursa Oil X★★ for Diesels and heavy-duty gasoline engines, for example, assures better compression and combustion, greater fuel economy and more power because special additives give this heavy-duty oil the valuable properties of detergency and dispersion. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained. *Ursa Oil X*★★ resists oxidation, protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco transmission and differential lubricants.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed below.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

For LOWEST NET COST PER YARD
TOURNAPULLS are the answer





on airports •

When Circle Construction Corporation fou
that Tournapulls could lick tough Long Isla
sand on the New York Idlewild Airport, th
built up their Tournapull fleet to 13,—wi
them, are moving 80% of their 2,500,0
cu. yd. contract. Time studies show Tourn
pulls average 84 pay yards per hour
2600' one-way hauls, 69.6 on 3600', a
66 on 4200' hauls. Tough airport jobs li
this have proved Tournapulls are the answ

• • on roadwork

Raemisch-Madden Co. used 11 Tournapu
to handle both grading and graveling
13 miles of U.S. 66 near Chenoa, Ill.
47,000 yards of sub-base, wet pit-run gra
was loaded, hauled 3 miles over paveme
and spread in 4 to 6" lifts with Tournapu
Each unit averaged 25 pay yards, loade
hauled and spread in place per hour.
400,000 yards of grading, when dirt was w
and spongy, Tournapulls averaged 55 p
yards per 50-minute hour on 3900' one-w
haul. For roadwork Tournapull speed is
well-known answer.

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JOB-PROVED
Over 3100 Built and Shipped

TOURNAP

on levees



Constructora del Sur is using 2 Tournapulls to build 2½ miles of select earth levee with very little sand content near Suchate, Mexico. This, in a country made up largely of sand, requires stripping sand overburden from small scattered earth seams. Next, earth is hauled and spread on the dike in uniform 8" layers. On this job Tournapulls tripled the output of similar capacity crawling tractor-scraper combinations.

on reservoirs



Peter Kiewit Sons Company used 3 Super C Tournapulls on this 600,000-yard reservoir job near Des Moines, Iowa. Working in moist, sandy clay, each unit loaded in 50 to 60 seconds, averaged 3,000-foot cycles every 6 minutes, delivered 120 pay yards per 60-minute hour. Tournapulls are the low-cost dirt-moving answer for your water control contracts.

on stripping



C. Arrington replaced a shovel and four 3-yd. trucks with 2 Super C Tournapulls on iron mine near Cedartown, Ga. These mobile rigs locate and strip ore pockets, load the ore, haul and dump to grizzly. Return grades run to 14%, average 10.5%; hauls vary from 1/2 to 4/10 mile one way. Ability to sample, strip or load ore — anywhere at any time — is a big Tournapull advantage on mining jobs like this.

on railroad grading



Here is another Kiewit job — 6 Tournapulls helped move 2,300,000 cu. yds. on a 23-mile relocation of Rock Island line between Perlee and Eldon, Iowa. Material handled was typical wet, sticky Iowa gumbo. Kiewit's repeat orders prove that they have found Tournapulls are the profitable answer for all types of earthmoving.

on job-to-job moves



Green Construction Co. saved time and money by driving 5 Tournapulls over state highways from Peoria, Illinois, to Oaktown, Indiana, 205 miles, in 13 hours' driving time. For hauling dirt on or over pavement and for economical job-to-job moves, Tournapulls with their big (5'6") rubber tires, are the answer.

APULLS

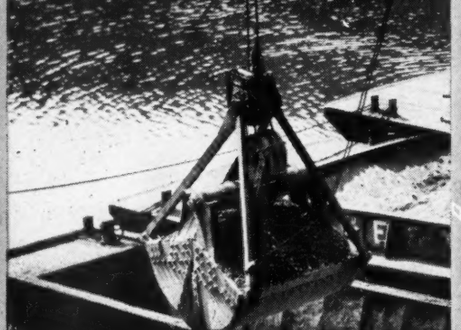
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Tournapulls have repeatedly proved their profit-making ability in all these fields by: (1) adaptability to all haul distances, (2) high speed for quick completion, (3) ability to profitably handle large or small jobs, (4) hauling over pavement. Let your LeTourneau distributor show you why all these cost-cutting advantages make Tournapulls your best bet for lowest net cost per yard. See him TODAY.

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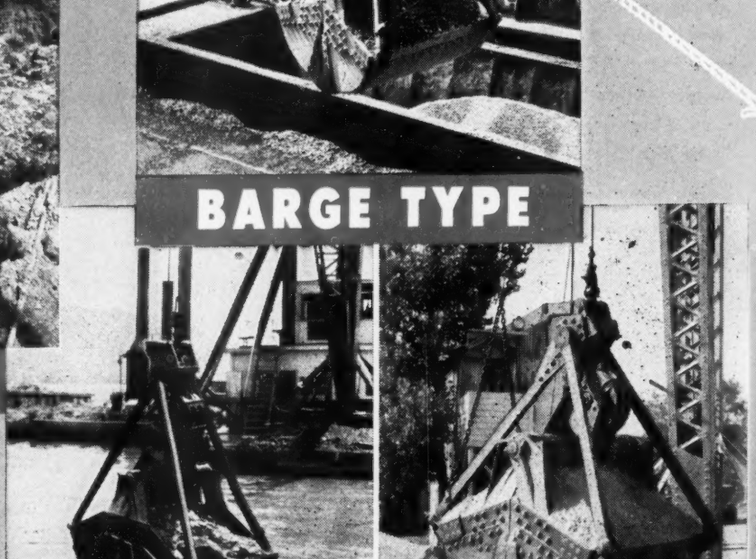






BARGE TYPE

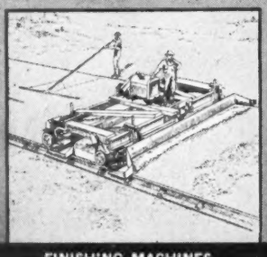
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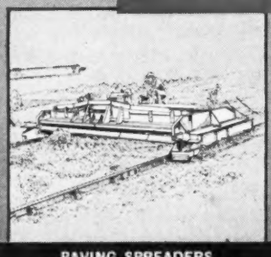
ARMY E NAVY

7 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence

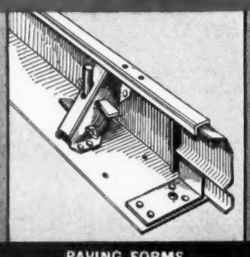
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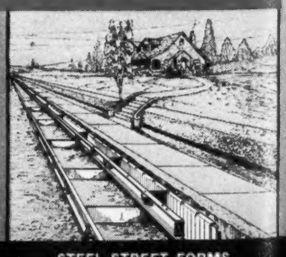
FINISHING MACHINES FOR ROADS AND AIRPORTS



PAVING SPREADERS FOR ROADS AND AIRPORTS



PAVING FORMS FOR ROADS AND AIRPORTS



STEEL STREET FORMS



THE *Right* BLAW-KNOX CLAMSHELL BUCKET FOR YOUR JOB

You have only to specify the size of crane and kind of work you want a clamshell bucket to do and Blaw-Knox will furnish the proper type and size to suit your particular requirements — do your work efficiently, quickly and at lowest possible cost.

The selection will come from the largest line of clamshell buckets available anywhere — all highly engineered — and field proved to do the job and take the hard knocks of rough usage.

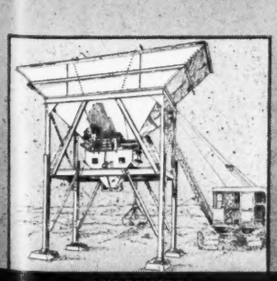
Such outstanding developments as ball-bearing lever arm sheaves (instead of ordinary bushings) which mean easier operation and longer cable life; proper weight distribution basically designed into the bucket (instead of trying to do it all with counter-weights) which provides greater penetration and digging power; one-piece main hinge which insures and maintains positive scoop alignment at all times — these and many other built-in advantageous features of bucket design become yours when you buy a Blaw-Knox Clamshell Bucket for your job.

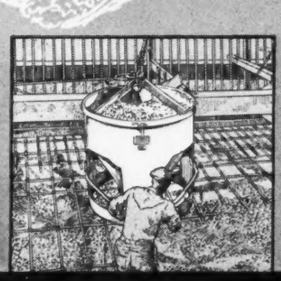
Your nearest Blaw-Knox Dealer will help you select the bucket you need.

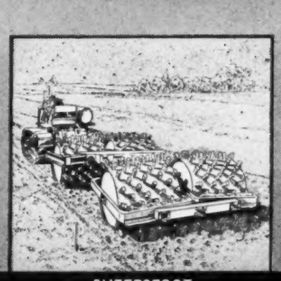
Send for Catalog 1757—A complete data book on Blaw-Knox Two-line Clamshell Buckets

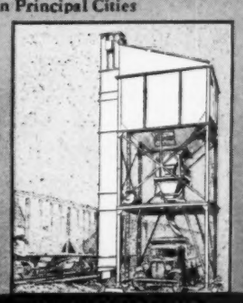
BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities


AGGREGATE BATCHING PLANTS

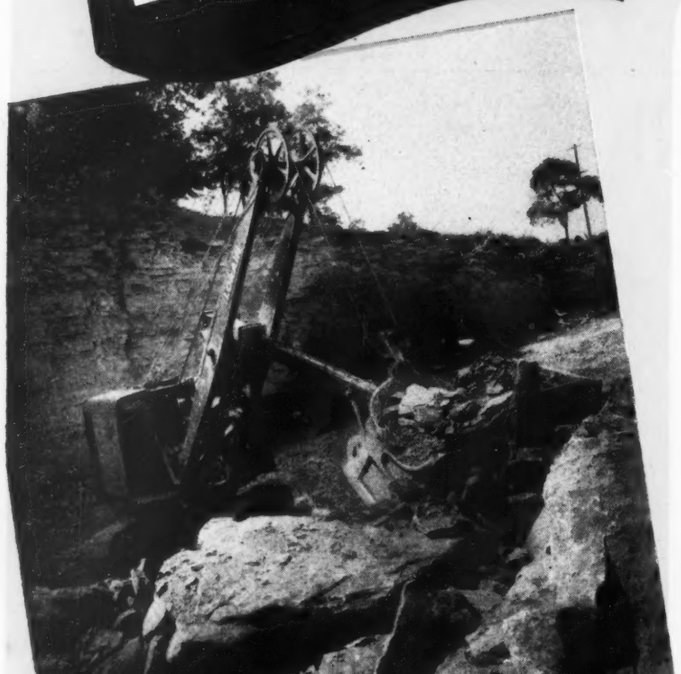

CONCRETE BUCKETS


SHEEPSFOOT TAMPING ROLLERS


BULK CEMENT PLANTS

24 REASONS for making the next one a LORAIN!





NOTE: All Lorain machines are fully and easily convertible for use as cranes, clamshells, draglines, shovels and backdiggers. Don't buy a single-purpose machine; keep future jobs in mind. One machine—one investment—can do a wide variety of jobs for extra profits!

1. Center Drive turntable.
2. Permits concentrating power on any one operation.
3. Permits spreading power for high-speed simultaneous operations.
4. Two-piece swing drums, roller bearing mounted, reversible bands.
5. Extra wide crowd clutch, roller bearing mounted.
6. Hydraulic coupling—no stall, no shock, no loafing; (used on L 82 and L 820).
7. Center "Chain" Drive crawler.
8. Two travel speeds either direction.
9. Steers either direction.
10. Safety travel and tread lock.
11. Mechanism runs in oil bath.
12. Generous underneath clearances.
13. Centralized lubrication.
14. Wider treads.
15. All-welded shovel boom (strength; all-steel; torsion-resisting).
16. All-steel welded dipper stick.
17. Dipper door stops to protect stick.
18. "Elbow action" power dipper trip.
19. Simultaneous hoist, swing and travel (or boom derricking).
20. High-speed boom hoist—power controlled boom derricking and lowering.
21. "Cable-Miser" fairlead with interlocking, geared sheaves.
22. Bolted butt crane boom connections, easy and quick to assemble.
23. All-purpose Crane Boom Head—6 part reeving with no top block; greater vertical reaches.
24. Backdigger Boom—with controlled tilting dipper; digs a vertical wall, a level floor, dumps exactly where wanted.

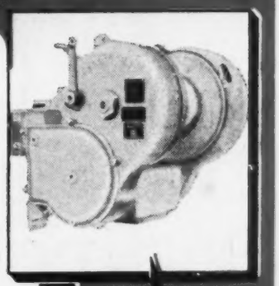
Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

Quiet Operation is
Smooth POWER at Work...
Isaacson WINCHOISTS are QUIET



The powerful gear-driven reversible Isaacson WINCHOIST

Quiet power . . . great power . . . are instantly apparent when you see the NEW, improved Isaacson WINCHOIST for International in action.

Operation is QUIET because spiral gears provide a maximum amount of teeth in mesh at one time . . . evenly distributed pressure and indirect contact lines . . . highly accurate, sturdy, precision-built mechanism. Great POWER means handling of large loads. Quicker hookup is possible. 50% faster reverse action allows unspooling at just the right speed for a man walking with cable end. Better balance due to closer mounting of winch to tractor, distributes load, properly saving equipment.

There is only one adjustment—the easily accessible brake takeup. All moving parts are enclosed yet easy to get at. Finger tip control brake, self-energizing on either over or under wind. Oversized bearings, shafts and gears.

AVAILABLE NOW . . . See your International dealer for further details or write us direct

Note how close WINCHOIST hugs rear of tractor.



ISAACSON
Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

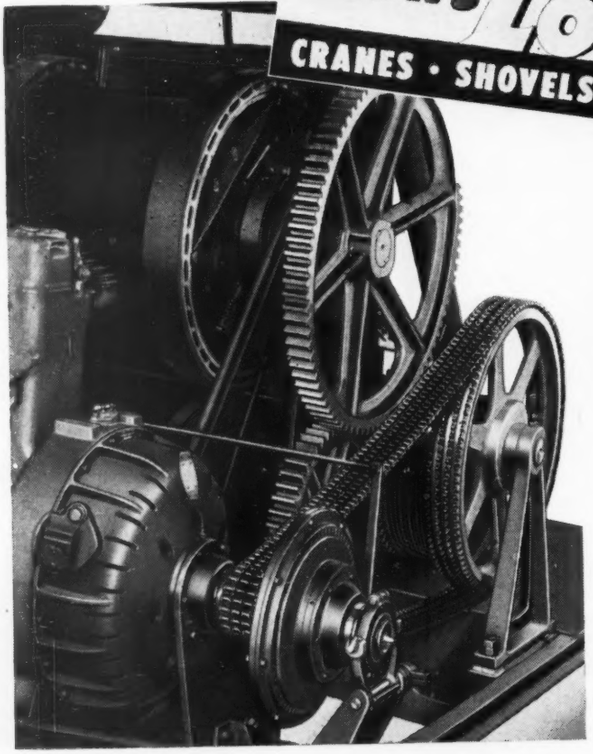
SUCH TONNAGE MEANS PLENTY OF POWER

and

Plenty Power to be Unfailingly Delivered



Below, *close-up of multiple Diamond Roller Chain Drive on the 2-yd. Lorain 82.*



The wide preference for Diamond Roller Chain Drives by leading builders of construction machinery has well been earned by many years of performance on equipment sent to all parts of the world.

The high ultimate strength and durability inherent in all Diamond Roller Chain Drives and their unfailing reliability in spite of long continuous operation and shock loading, are particularly important on equipment used for such tough jobs encountered by power shovels.

It is well to be sure that Diamond Roller Chain Drives are on the equipment you buy. DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7, Ind. Offices and Distributors in All Principal Cities.

DIAMOND ROLLER CHAINS

THEY "GO IN" UNDER CANVAS



Official U. S. Coast Guard P

Iwo Jima, Okinawa, and on to Tokio—our Armed Forces "go in" under *canvas*, material of war second only to steel, explosives, gasoline, food.

Millions of yards of FIRE CHIEF-Finished Duck—the entire output of one of the largest heavy textile mills in the world—have gone to war because this HOOPERWOOD "Engineered Canvas" offers just what our government and our allies require in a fire, water, mildew, weather and wear-resistant Canvas for world-wide service under the most severe conditions imaginable.

And this amazing, war-proved product holds great promise for post-war applications extending the usefulness of Cotton Duck.

For instance—as awning material, it can't be ignited by cigarettes or other hazards of carelessness. As welding curtains, it actually defies an oxy-acetylene flame to set it afire. As covers for trucks, it will out-weather former materials several times over. Down in a mine or under the worst climatic conditions, mildew cannot attack it. As lifeboat covers, hatch covers and other marine canvas specialties, it helps remove much of the fire hazard on shipboard. As construction windbreaks and tarpaulins, it promises to lessen materially fire losses in building operations.

These are but a few of many opportunities for the use of HOOPERWOOD "Engineered Canvas" to save lives, property, production time and profit in the post-war world.

WM. E. HOOPER & SONS COMPANY, Phila., Pa.

NEW YORK · CHICAGO

MILLS: WOODBERRY, BALTIMORE, MD.

OPERWOOD
REG. U.S. PAT. OFF.
DUCK
ALTIMORE

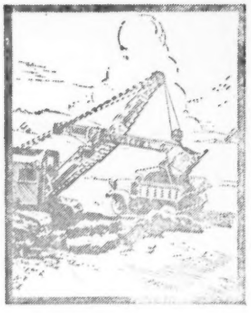
Fire-Chief Finished (PATENTED)

HOOPERWOOD COTTON DUCK



"HERCULES" (Red-Strand) Wire Rope

For *Every* Heavy Duty Purpose



All wire ropes do not operate under the same conditions: Some must be extra flexible; some are subjected to excessive wear and stress; and there are many uses where a combination of severe conditions must be met.

In order to be suitable for every heavy duty purpose, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of constructions—both Round Strand and Flattened Strand—all of which can be furnished either Preformed or Non-Preformed. A "mis-fit" rope, either in type, construction or quality, will definitely increase operating cost.

Moreover "HERCULES" is made of carefully selected and rigidly tested materials. Modern facilities, long experience and advanced manufacturing methods insure correct fabrication.

When you adopt the Red-Strand as your wire rope guide, you are assured of dependable and economical results.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

"HERCULES" (RED-STRAND) WIRE ROPE

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

There's been a big change



★ The tank wagon of the horseless carriage days has grown up. Huge transport tanks now serve America's millions of essential cars, trucks and tractors.

The demand for a better tapered roller bearing grew, too. And Tyson found the way to make that better bearing—by adding 30% more rollers around the raceway.

Those extra rollers mean greater load-carrying capacity . . . extra rigidity . . . maximum efficiency . . . and *almost double bearing life.*

Tyson "All-Rolls" Bearings are solving heavy-duty problems for users everywhere. They'll do the same for you.

TYSON BEARING CORPORATION, MASSILLON, OHIO

COUNT THE ROLLS · THE ROLLS COUNT

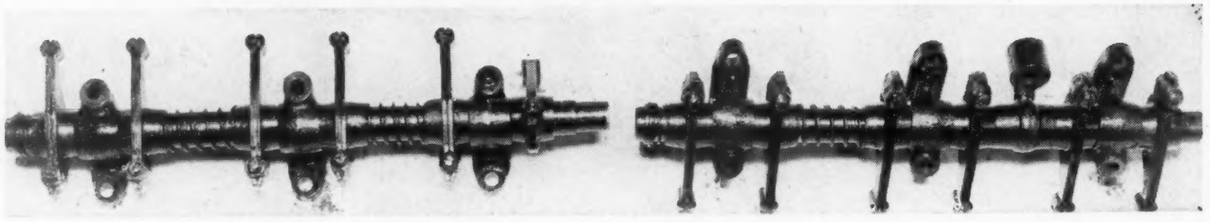


Tyson

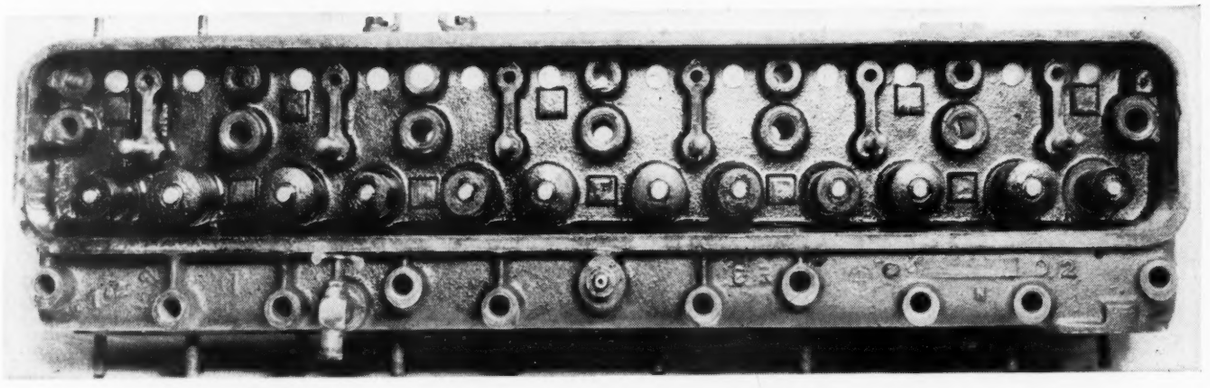
THE LAST WORD IN ANTI-FRICTIONEERING

★ BUY WAR BONDS FOR KEEPS ★

118,000 miles without major repairs



made possible by Stanolube HD



plus Standard's Streamlined P.M.



The pictures tell the story. They're parts from an International KR-11 Tractor on a 5400 gallon fuel transport as they came from the engine after 118,000 miles operation. Rocker arms (top) and cylinder head (middle) are nearly as clean as when they were installed. Pistons (above) had no varnish deposits, rings were free and oil ring slots open.

Mr. John G. Steger, Manager of the Terminal Transport Company, St. Paul, says, "Stanolube HD speaks for itself in the record of this truck." He's also enthusiastic about Standard's Streamlined Preventive Maintenance. You can get all the facts about this simplified P.M. Plan and Stanolube HD from your nearest Standard Oil Company (Indiana) office, or by writing 910 South Michigan Avenue, Chicago 80, Illinois. Ask for the Standard Oil Automotive Engineer.

Buy more War Bonds

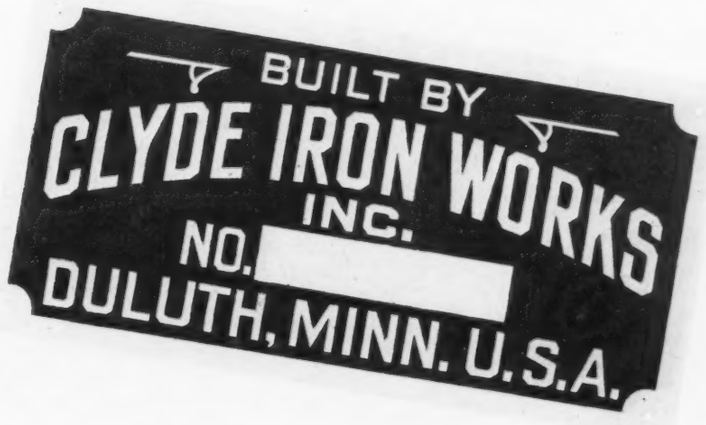
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

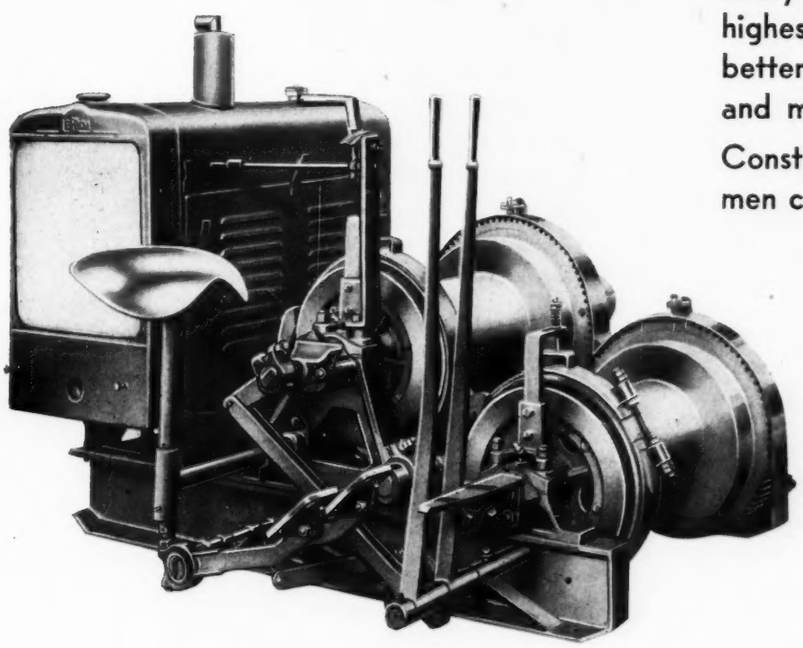
★ **FLEET CONSERVATION SERVICE**

Clyde on your hoist means

SATISFACTION ON YOUR JOB!

This name plate on your hoist is your guarantee of dependable service.





Every Clyde hoist is engineered to the highest efficiency standards to assure better performance, greater economy and more profit to users.

Construction and material handling men cannot take a chance on inferior or questionable equipment. To make sure of steady, trouble-free service . . . to maintain production schedules . . . use equipment that is universally acknowledged as leaders in its particular field.

Write for special bulletins that give full details on any type of Clyde Equipment.

HOISTS . . . DERRICKS . . . WHIRLEYS . . . CAR PULLERS . . . HAND POWERS . . . BUILDERS TOWERS . . . MINE HOISTS . . . WINDLASSES . . . WINCHES . . . PILE DRIVERS . . . BARGE AND DREDGE MACHINERY . . . LOGGING MACHINERY

CLYDE

CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

Here a new science attacks an old problem



Cylinders in engines usually get a pretty raw deal. They have to take more grueling punishment than any other part of the engine. They . . . and the rings . . . bear the brunt of the blame when engines lose power.

Here, in the Van der Horst Research and Engine Testing Laboratories, we are continuously attacking this old problem of wear. The new science of PORUS-KROME processing is attuned to the needs of the various types of engines. Tests are run in several types of engines to determine the degree and type of porosity which will give the maximum wear resistance. Every development or change in PORUS-KROME processing is forthwith scrutinized by the "Lord High Inspector" . . . *the engine.*

Let's work out *together* a square deal for *your* cylinders. Our engineers will gladly develop with your engineers the specifications which will multiply cylinder life 4 to 20 times . . . ring life 3 to 5 times. The entire facilities of these laboratories are committed to solving the problem of cylinder wear for engine manufacturers.

Even though building of engines for general use is still restricted, it is none too soon to plan for the use of PORUS-KROME in postwar engines. A request from you will bring complete information about PORUS-KROME. *Van der Horst Corporation of America, Olean, New York, Cleveland 11, O.*

PORUS - KROME . . . *Good for the Life of your Engines*



Totalitarian enemies have learned . . . the hard way . . . that our B-17's, B-24's and B-29's all pack a lethal sting. We're proud of the job America's B's have done, and are doing . . . proud, too, of the fact that hundreds of Huber Rollers, busy on airfield and airstrip construction and maintenance in every quarter of the globe, have helped pave the way for their sorties.

THE HUBER MFG. COMPANY ● MARION, OHIO, U. S. A.

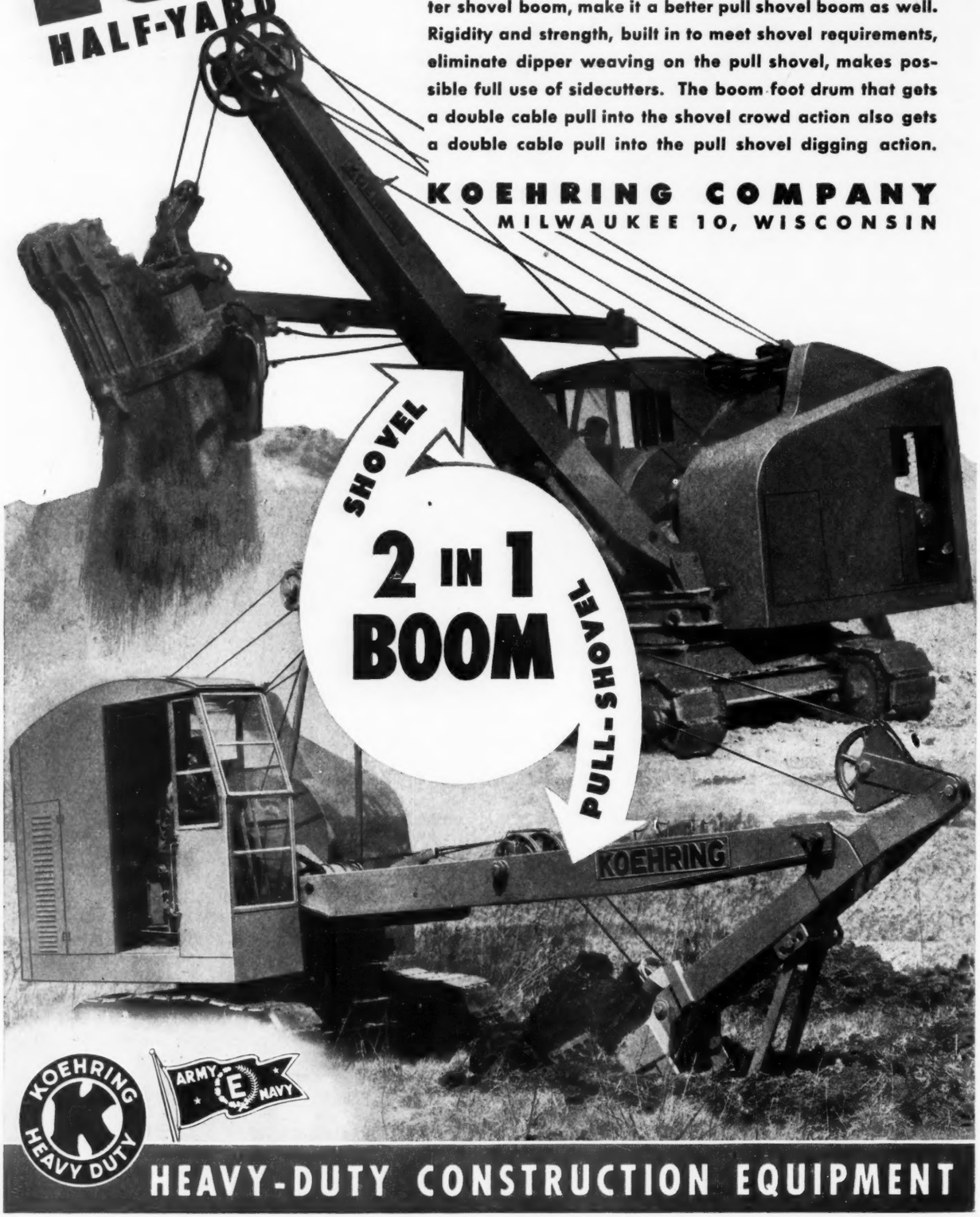
HUBER ROLLERS

205 HALF-YARD

Saves ONE-HALF *the Cost* OF AN EXTRA PULL SHOVEL BOOM

You save one-half the cost of separate pull shovel boom. The same features that make the Two-in-One boom a better shovel boom, make it a better pull shovel boom as well. Rigidity and strength, built in to meet shovel requirements, eliminate dipper weaving on the pull shovel, makes possible full use of sidecutters. The boom foot drum that gets a double cable pull into the shovel crowd action also gets a double cable pull into the pull shovel digging action.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN



HEAVY-DUTY CONSTRUCTION EQUIPMENT

BUILD BETTER *Dams*



. . . with aggregate from a CEDARAPIDS UNITIZED PLANT



On those big jobs where tonnage of aggregates runs into the hundreds of thousands, the difference of a few cents per ton in production cost may mean profit or loss to the contractor. That's where the big Cedarapids Unitized Plant with its high capacity and low operating costs pay big dividends.

This super crushing plant handles material in a continuous flow from quarried rock to delivery trucks at the rate of 150 to 200 tons per hour. The big primary with its 1000 sq. in. jaw opening sets the pace for the entire plant taking the biggest rock with ease. A smaller jaw crusher and roll crusher in the secondary unit then reduce the oversize to the wide range of sizes to meet all aggregate specifications. Each unit is mounted on a pneumatic-tired truck ready to attach to a truck-tractor. Costly dismantling and erecting time have been eliminated so idle time is kept to the minimum.

Get ready for those BIG postwar jobs now. With a Cedarapids Unitized Plant to produce the aggregate at lowest cost you'll be sure of getting your share.

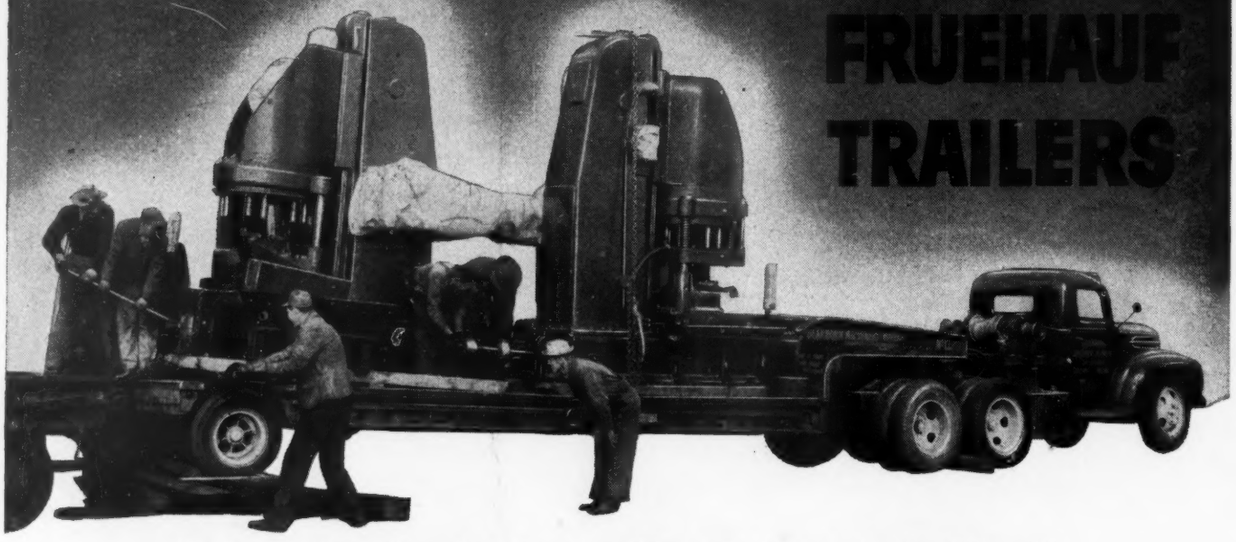
IOWA MANUFACTURING CO.
Cedar Rapids, Iowa

THE IOWA LINE
of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS
STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS—TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

"WANTED YESTERDAY"

...that's a Job for FRUEHAUF TRAILERS



Dearborn Machinery Movers load two big multiple spindle drills on a Fruehauf "Carryall"

"WE want the job done yesterday" is a common expression in the heavy industrial field. It's practically all rush work. And nearly every haul is a heavy one, yet the huge loads are often delicate and must be transported safely and securely.

Typical of those engaged in the important task of moving machinery from manufacturers to plants, or from one factory to another, is Dearborn Machinery Movers Company of Dearborn, Michigan. Operating among the war plants in the Detroit area, and in a surrounding radius of 100 miles, this company keeps six Fruehauf drop-frame "Carryalls", as well as two other units, busy moving machinery where it is wanted, when it is needed. Dearborn Movers are handling six to eight of these machinery moving jobs per day.

All over the country, machinery movers equipped with sturdy Fruehauf "Carryalls", capable of handling anything from 8 to 100-ton loads, are ready for the big job ahead.

If heavy hauling is your business, today is not too soon to call in the nearest Fruehauf representative to help you get the Carryall you'll need tomorrow designed and ready for the production go-ahead.

★ ★ ★

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY - DETROIT 32

Service in Principal Cities

FRUEHAUF TRAILERS *"Engineered Transportation"* REG. U.S. PAT. OFF.

Stop COSTLY MATERIAL Delays

Big capacity semi-trailer tanks —under your own direction —can pick up the material at the refinery and deliver it right to your distributor on the job —no costly shut-downs waiting for the asphalt to arrive.

Distributor always free and ready to spray. No longer necessary to send it back to pick up a load of asphalt.

Capacities, ranging from 2500 to 4000 gallons, are strictly dependent upon State Highway weight laws. Write us today for the maximum capacity allowable in your state.



3000 gallon, frameless asphalt supply tank equipped with one burner and return bend fire tube.



3200 gallon supply tank equipped with transfer pump and motor in an inclosed housing.



2000 gallon semi-trailer mounted Model 424 asphalt distributor equipped with a 375 gallon per minute pump and 24' full circulating spray bar.

OTHER PRODUCTS
Asphalt Distributors
Tar Kettles • Maintenance Distributors
Burners-Streetflushers
Surface heaters-Spray Units • Supply Tanks
Shoulder Rollers

SALES OFFICES IN PRINCIPAL CITIES

Standard Steel Works
NORTH KANSAS CITY, MO., U.S.A.



"We were singing away—
when suddenly it dawned on me!"

"WHAT a whale of a job motor transport will have to do when this war is over.

"Sure, I know trucks are already doing a big job — in the Army and for the war effort — but after the war they will have to do still more. Not only will they have their own loads to carry, but they will help air, rail and water transportation systems carry their loads, too. All that adds up to plenty of opportunity for guys like me. It means a chance to get ahead.

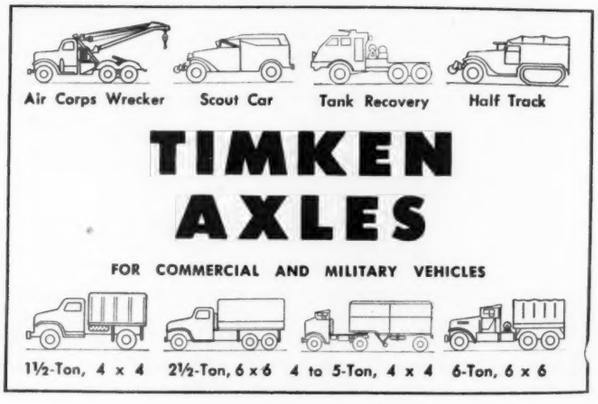
"I've learned plenty about motor transport in the Army, but I think the most important thing I got is how necessary it is to fit the truck to the job."

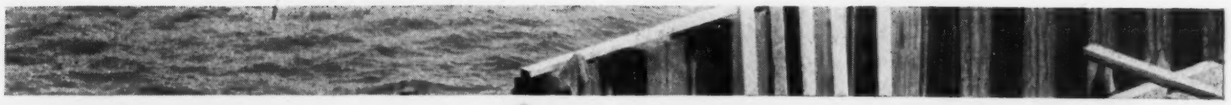
• • •

MOTOR TRANSPORT will be called upon to serve the nation in literally hundreds of different ways after the war. The necessity for moving maximum loads in minimum time and at lowest possible cost will open up thousands of new opportunities.

Regardless of what your hauling operation is — whether it is one of local delivery, inter-city freight hauling, logging, handling petroleum products or delivering farm produce to market — manufacturers will be ready with a wide selection of vehicles to fit *your* job. And Timken will be ready with improved Axles, backed by 39 years of Axle Engineering experience, to meet the requirements of every vehicle manufacturer.

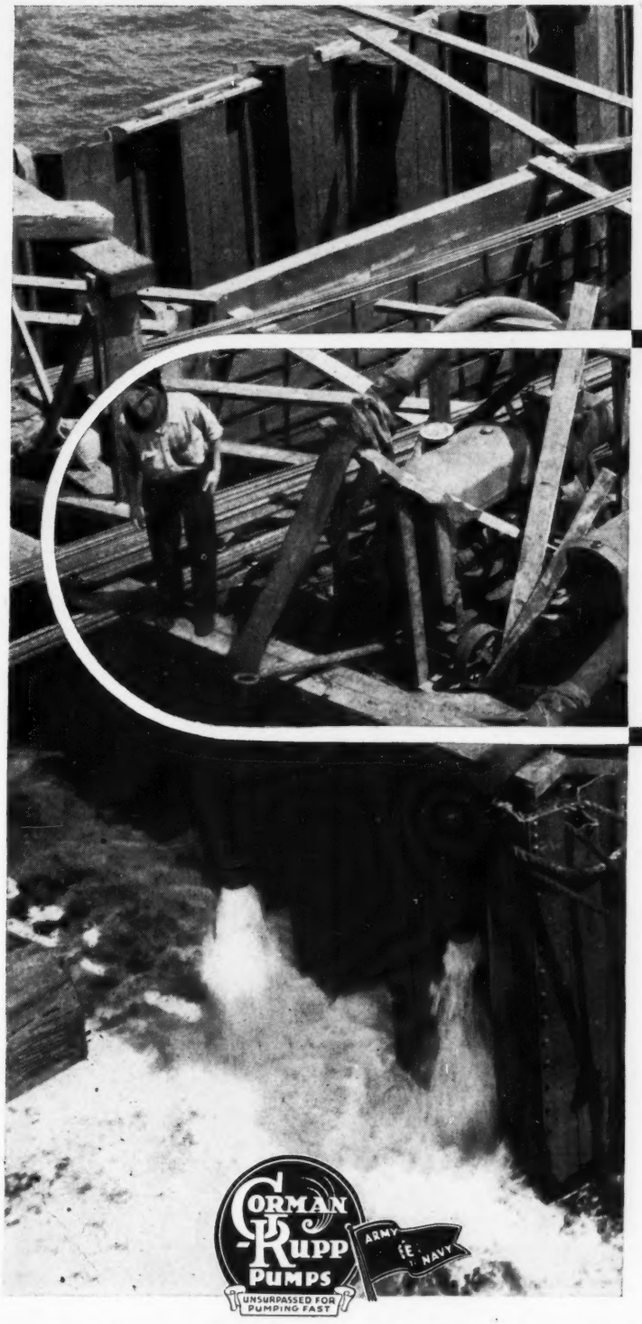
THE TIMKEN-DETROIT AXLE CO., DETROIT 32, MICH.
WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN





Contractors pumps can't be

"CHOOSY"



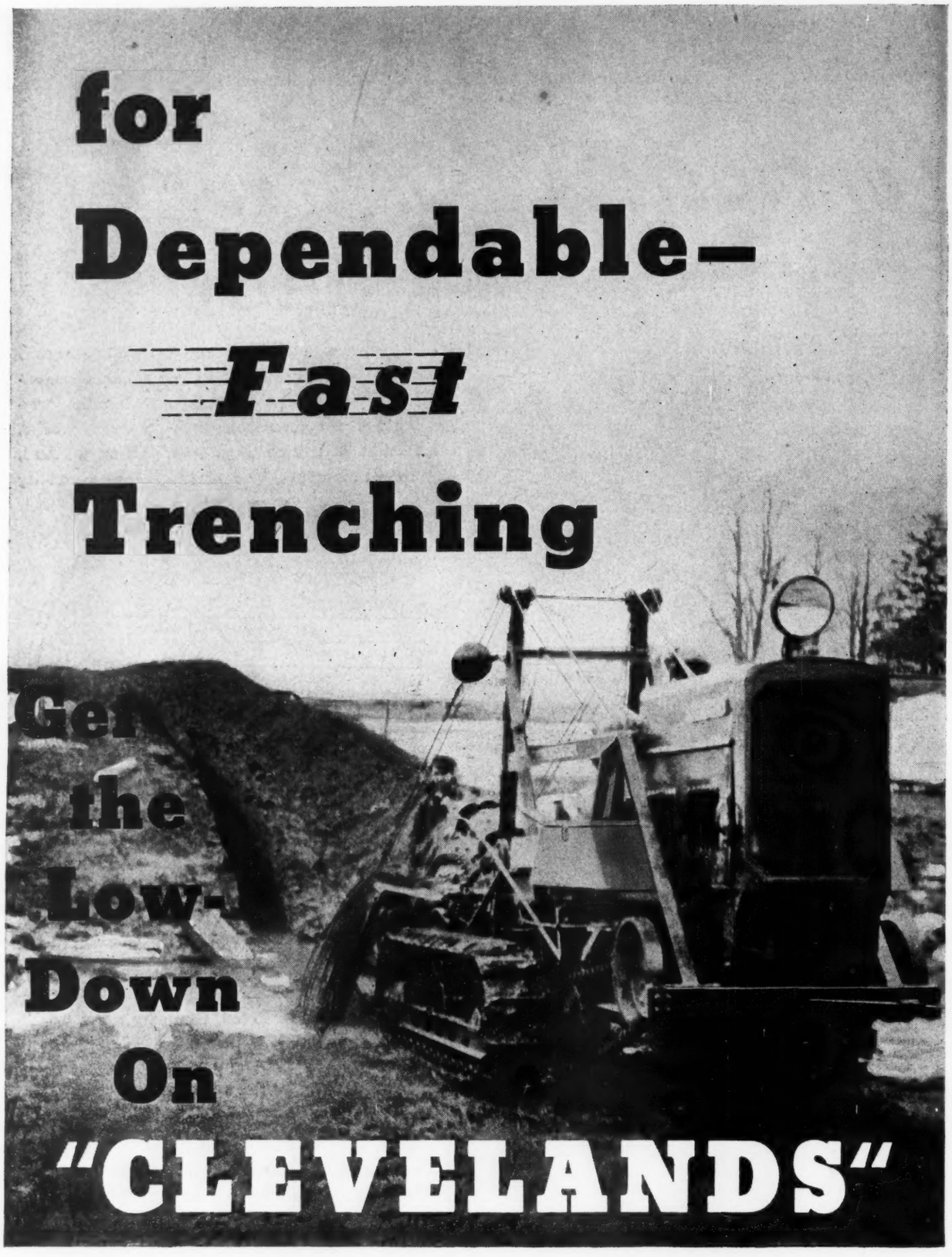
They have to pump more than water -- muck, weeds, sand, gravel and other solids. Gorman-Rupp self-priming centrifugals handle anything that comes their way for days, weeks, months at a time, if you want them to. And, they'll stand up. There's not a quitter among them! There's a big reason for this. The insides of a Gorman-Rupp are by far the simplest ever made – no small openings. No by-pass tubes, no sharp corners, no tricky valves. There's no place for refuse to stick or lodge. All internal passages are genuinely streamlined. Trouble is saved. Capacity stays up. Efficiency goes up. Repairs stay down. Thirty to sixty days without a stop and without harm to the mechanism is common with Gorman-Rupp Pumps. You can handle more water per hour, size for size of pump; more and bigger solids; with less trouble and up-keep; and with less fuel, when you do your pumping jobs with a self-priming Gorman-Rupp. We will place one in your hands and let you be the judge.

CAPACITY IN GALS. PER HOUR
with Pump 15 ft. above water

	TOTAL HEAD (incl. friction)			
MODEL	30 ft.	40 ft.	50 ft.	60 ft.
10-M	9000	7800	6600	4500
20-M	16500	15000	12600	9600
40-M	34500	33900	32700	30600
90-M	76800	73800	69600	63000
125-M	109200	104400	97200	90000

THE GORMAN-RUPP COMPANY

M A N S F I E L D , O H I O



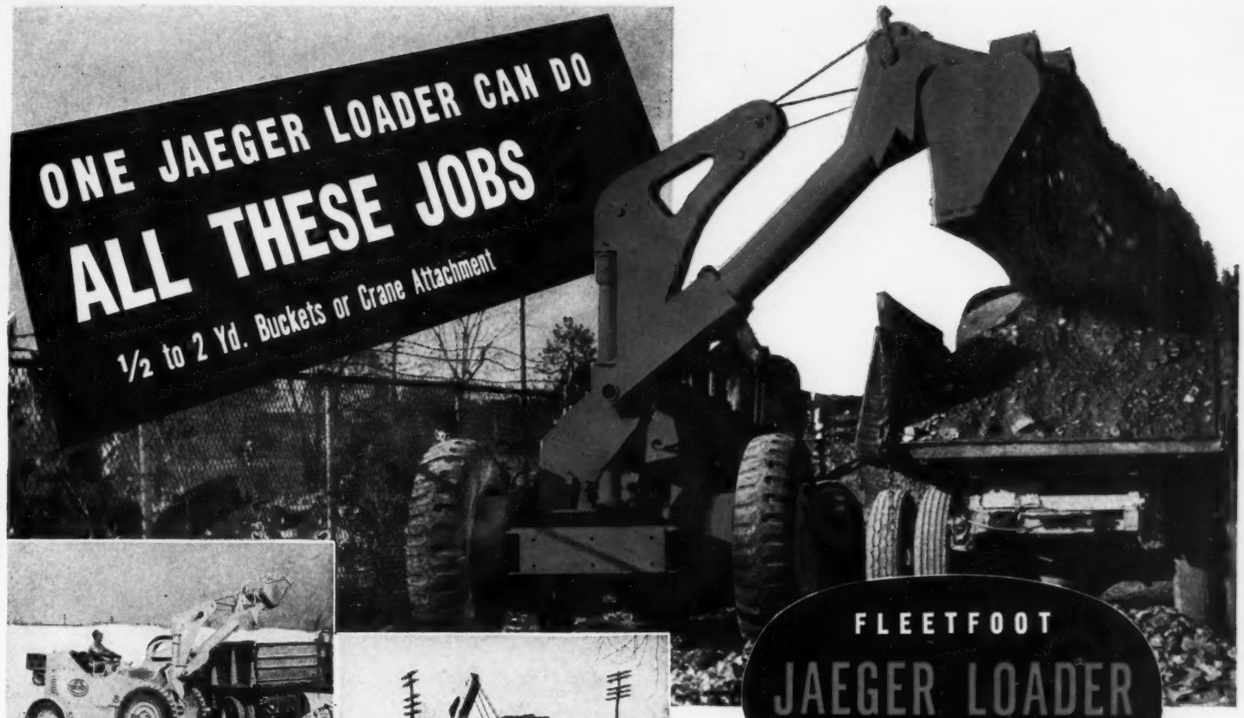
THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO

"CLEVELANDS" Save More . . . Because They Do More

ONE JAEGER LOADER CAN DO ALL THESE JOBS

1/2 to 2 Yd. Buckets or Crane Attachment



FLEETFOOT

JAEGER LOADER

CRANE and EXCAVATOR

LOAD STONE, gravel or sand with fast ¾ yd. bucket.



LIGHT EXCAVATION — Can dig outside its wheels.



DIG AND LOAD EARTH with ½ to 1 yd. buckets.



GRADING, BACKFILL — Ample traction for light bulldozing.



LOAD COAL, BRICKS, etc., into any size trucks—¾ or 1 yd. buckets.



12-25 FT. CRANE ATTACHMENT handles up to 6-ton loads.



REMOVE SNOW OR ASHES — 2 cu. yds. at a load.



Digs, Swings, Hoists and Dumps in One Continuous Movement

For contractors, municipalities, utilities, counties and state highway depts., the Jaeger "Fleetfoot" does the work of front-end loaders 3 TIMES FASTER, plus many additional time and labor-saving jobs. 180° swinging boom means NO MANEUVERING to load — works in tight places. TREMENDOUS CROWDING POWER with 80% of load on big front driving wheels means it can dig into any material, do prime moving, light excavating, bulldozing, clean-up work. TRAVEL SPEEDS TO 15 M.P.H. take it wherever it needs to go.

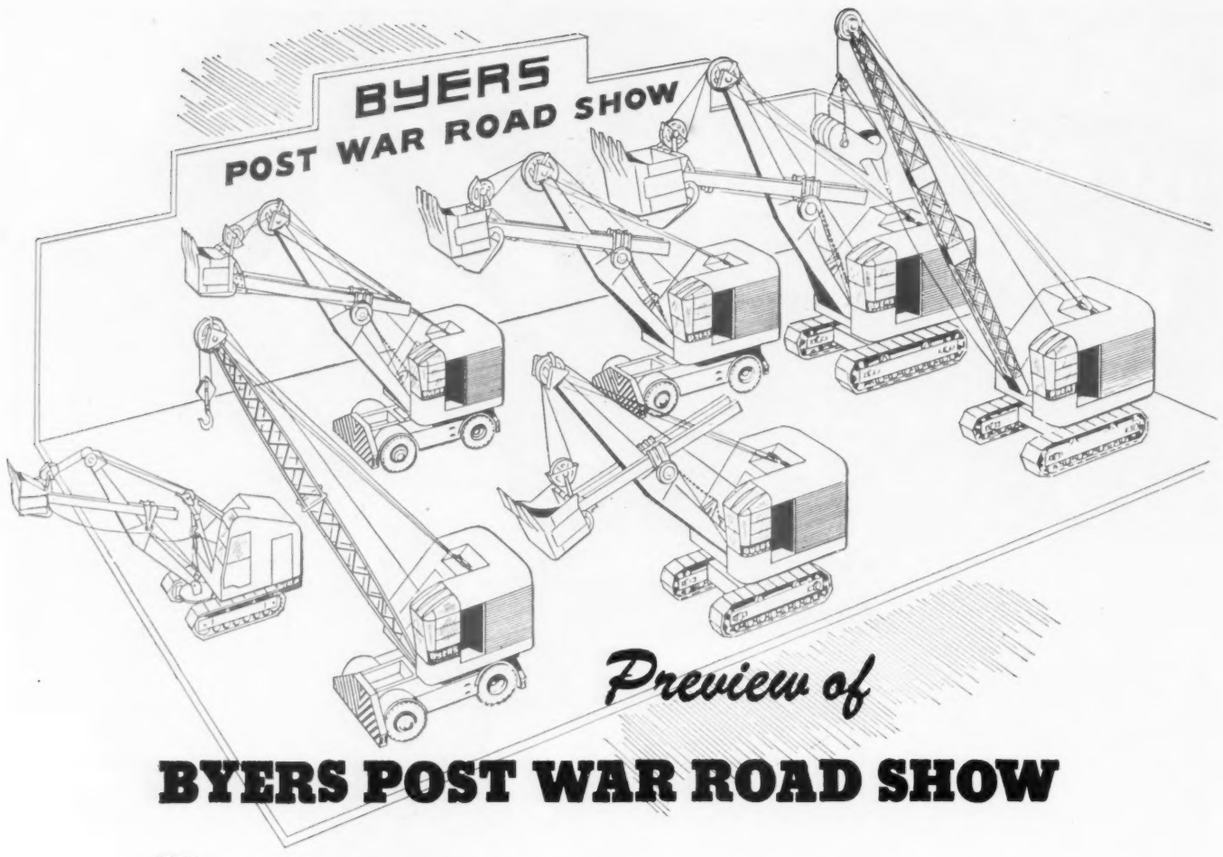
Send today for 52-page Catalog JL-5 showing a hundred year 'round uses and advantages for this mobile, fast, all-purpose Loader, Crane, Excavator.

THE JAEGER MACHINE COMPANY

Main Office and Factory — Columbus, Ohio

REGIONAL OFFICES:	8 E. 48th St. **NEW YORK 17, N.Y.**	226 N. LaSalle St. **CHICAGO 1, ILL.**	235-38 Martin Bldg. **BIRMINGHAM 1, ALA.**

Air Compressors, Mixers, Pumps, Hoists, Paving Machinery, Truck Mixers—Distributors in 120 Cities



Preview of

BYERS POST WAR ROAD SHOW

When Byers Post War Road Show opens, you'll want to make a thorough inspection of these greatly improved shovels and cranes which introduce so many valuable and interesting design, operating and maintenance innovations. Your nearby Byers reliable distributor will have complete information about them.

Be sure to inspect—

1. Byers "Junior", a sturdy new ⅜ yd. partial swing excavator that meets small job requirements.

2. Byers ½ yd. "Traveler", a highly mobile rubber tired, one man operated shovel or crane that already has a long and enviable record of accomplishment on war jobs.

3. Byers Model 61, built to the same specifications as the ½ yd. Traveler, except for conventional crawler mounting

4. Byers ⅝ yd. Traveler, built like its ½ yd. counterpart.

5. Byers ⅝ yd. Model 71, similar to the ½ yd. Model 61.

6. Byers pre-war ¾ yd. Model 83, modernized.

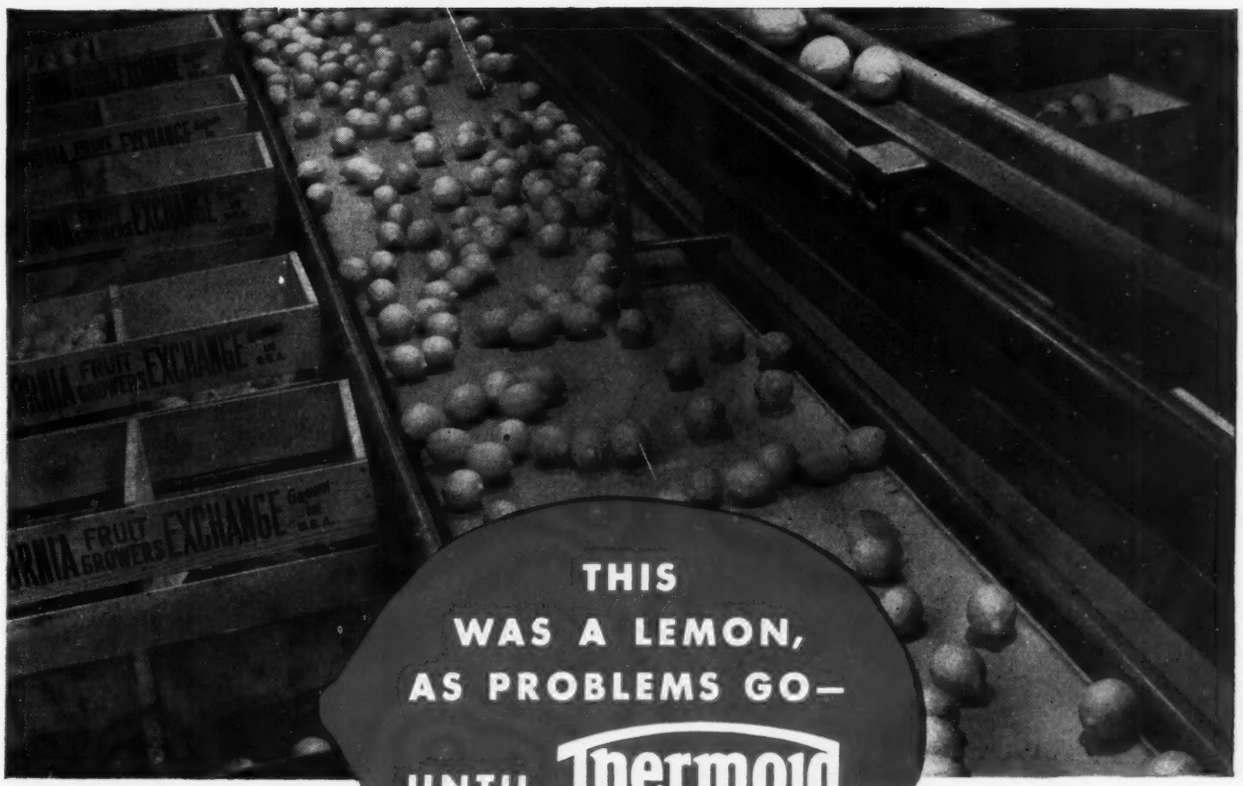
7. Byers 1 yd. Model 111, a dependable toughened excavator of full 1 yd. capacity, built to the same basic design as smaller new models.

AMERICAN ROAD BUILDERS' ASSN. · 1902 ·

THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributors throughout the World



THIS WAS A LEMON, AS PROBLEMS GO— UNTIL Thermoid SOLVED IT!

While studying the citrus fruit packing industry, Dr. McClelland discovered that lemon sorters and graders were suffering unusual eye fatigue, which could be corrected by using grading belts of a special color. Dr. McClelland then specified a color which would give sufficient contrast to the color of the fruit for efficient sorting and yet provide a softer background, restful to the eyes of the graders.

Thermoid worked with Dr. McClelland. We found there were three things to be considered in making this new conveyor belting: (1) Making belts match the colors specified; (2) Making the belt's surface impervious to fruit mold—also a surface which would be easily sterilized; (3) Making a belt with a surface that would not rub off or discolor the fruit.

Thermoid is the only company licensed to manufacture Dr. McClelland's "Easy on the Eyes" Conveyor Belting. When war time restrictions are lifted, Thermoid will manufacture more of this belting.

This example of problem-solving ability was taken from our files to demonstrate that Thermoid engineering, research and manufacturing facilities—and the services of Thermoid's field representatives—are at your disposal in the solution of *your* industrial rubber problems.

DON'T PUT IT OFF 'TIL TOMORROW *Buy More War Bonds Today!*

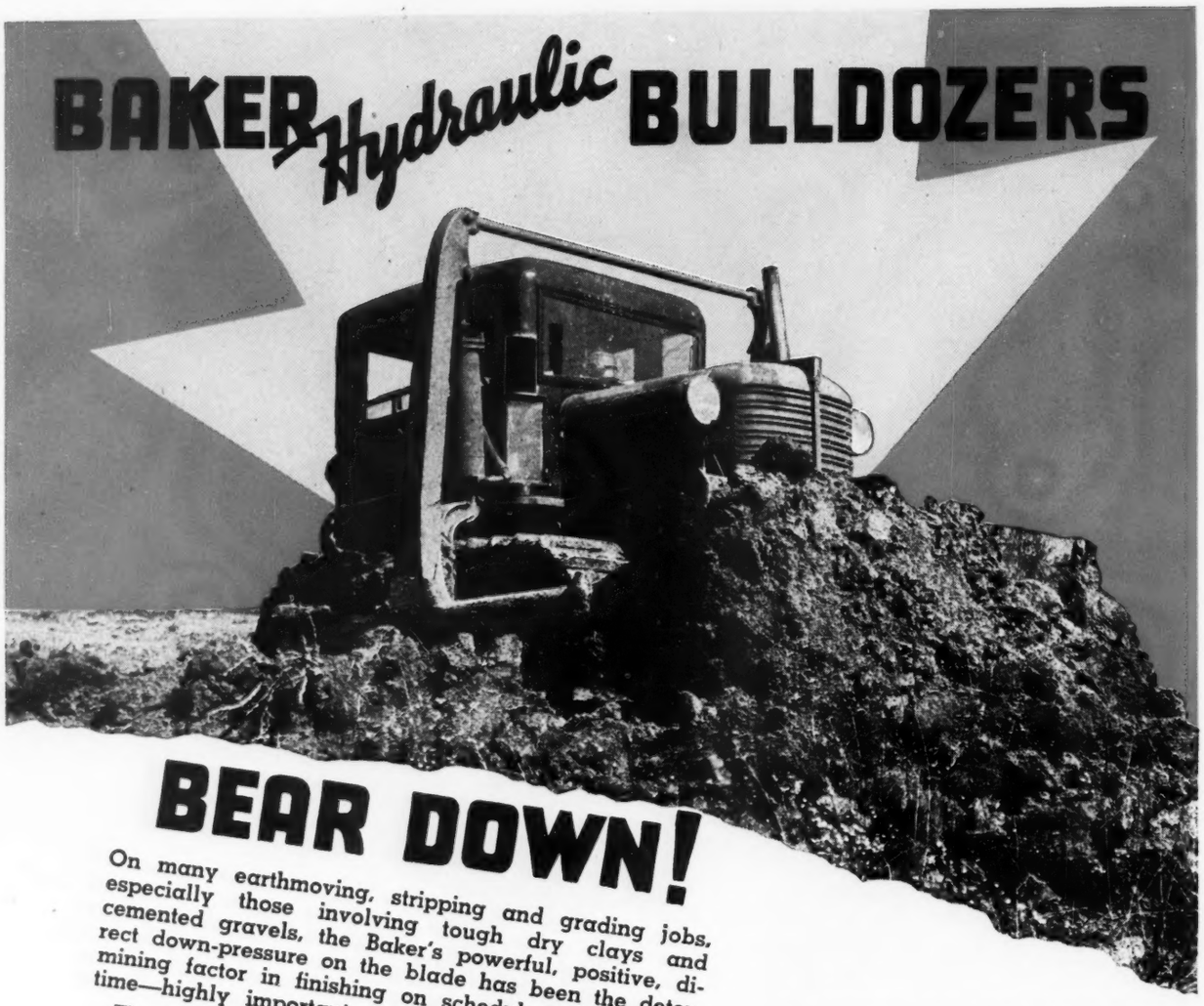
Thermoid Rubber

DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

"IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID"

THE THERMOID LINE INCLUDES: TRANSMISSION BELTING • F. H. P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS

BAKER *Hydraulic* BULLDOZERS



BEAR DOWN!

On many earthmoving, stripping and grading jobs, especially those involving tough dry clays and cemented gravels, the Baker's powerful, positive, direct down-pressure on the blade has been the determining factor in finishing on schedule—or ahead of time—highly important on war construction jobs.

The full weight of the tractor front end can be brought to bear on the blade forcing it to cut in—the operator need not depend upon the weight of the blade or gravity to force it into a cut.

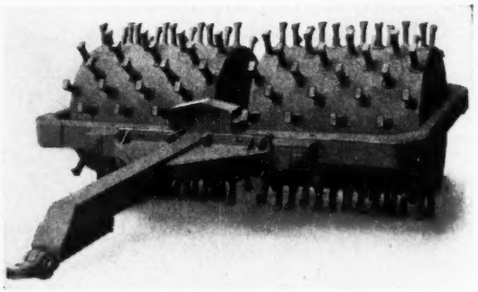
Baker hydraulics offer all the other desirable features —fast reaction, high moldboard lift, all-weather operation, ease of maintenance (what little is needed).

Why not figure on having Baker *hydraulic* Bulldozers "bear down" on your postwar jobs?

THE BAKER MFG. CO.
568 Stanford Ave., Springfield, Ill.
If it concerns Victory, it concerns us!

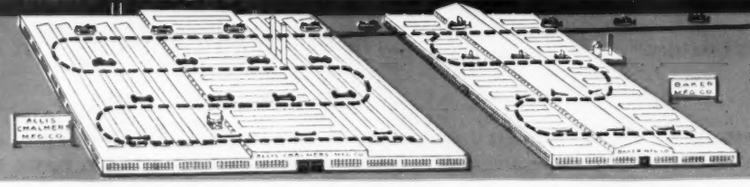
BAKER
They Go Together
A-C

BAKER SHEEPSFOOT TAMPING ROLLERS



- **Full oscillating rollers that follow contour of ground.**
- **Rugged frame and rollers that withstand abuse.**
- **Tamping feet have replaceable weld-on toes.**

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.



CONSTRUCTION SPEEDED BY 2-CYCLE DIESELS

Each extra trip means that much more dirt moved! 2-cycle Diesel tractors gain those extra trips:

BY getting to work quick — electric starting on Diesel fuel gains minutes every day.

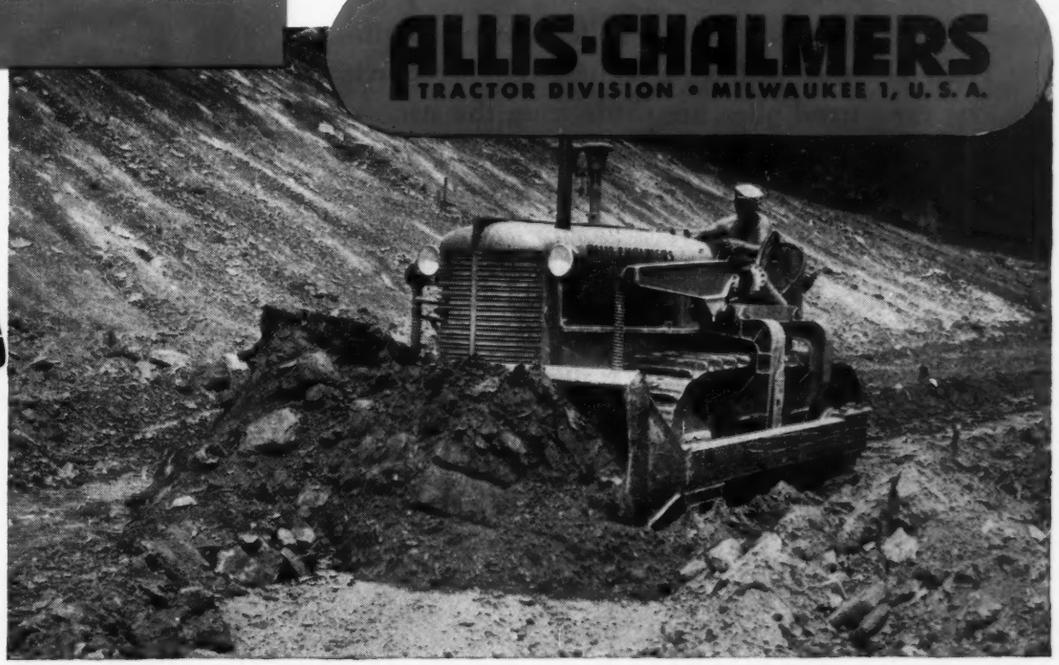
BY requiring less time out for lubrication — you save ½-hour lubricating time every shift with the 200-hour truck wheels and idlers.

BY working faster — smooth-operating, fast, 2-cycle Diesels speed bulldozing and hauling, provide greater flexibility in speed with less shifting.

A further time- and money-gainer is convenient interchange of many engine parts between all models. Repairs are simplified, inventory reduced.

Speed construction with 2-cycle Diesels. Get the full story on this modern power from your Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.





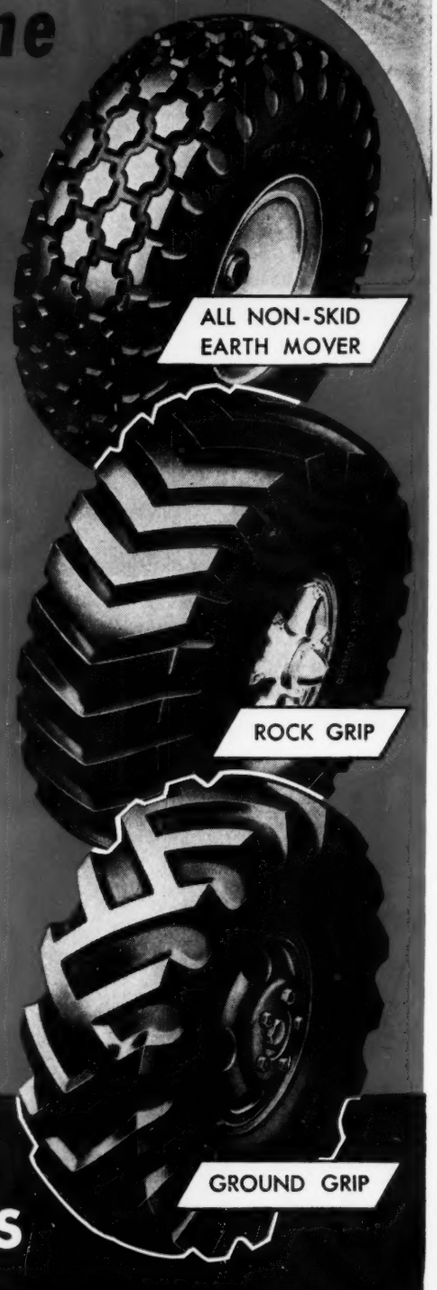
Buy Bigger Bonds For The Bigger Seventh



In Races Against Time

Firestone

TIRES PAY OFF



YOUR profits depend on completing the job before the deadline. Delays are costly!

Dependable tires are all-important. Records prove that. They show that the most profitable earth-moving equipment rolls on Firestone Off-the-Highway tires. They're tougher . . . longer-lasting.

There are many sound, solid reasons for this. Their Gum-Dipped cord bodies, reinforced with four extra tread plies, are made from the strongest rayon. Double-thick sidewalls guard against snags and rut wear. Tread rubber is tough . . . cut-resistant.

On your jobs today . . . and it will be as true tomorrow . . . you safeguard your profits by using Firestone Off-the-Highway tires.

For the best in music, listen to the "Voice of Firestone" with Richard Crooks and Gladys Swarthout and the Firestone Symphony Orchestra conducted by Howard Barlow every Monday evening over NBC network.

FIRESTONE
OFF-THE-HIGHWAY TIRES

Copyright, 1945, The Firestone Tire & Rubber Co.



REMEMBER THE DAYS WHEN YOU CHOSE UP SIDES . . . AND HOW IMPORTANT IT WAS TO GET IN "FIRST LICKS"?

This typical American trait of getting there first . . . of staying a jump ahead of the other fellow . . . will be mighty important now that V-E Day permits many peacetime operations to be resumed.

The construction industry will lead the way and those firms, ready *first* to undertake the important work that lies ahead—and well equipped with the necessary machinery to do the job—will enjoy a hard-to-overcome advantage over less progressive competitors.

C.I.T. is sponsoring a brand-new financing plan for the purchase of construction equipment—different in terms, lower in cost and simpler in operation—that makes it easy for dealers and contractors alike to meet the demand for much needed machinery without depleting working capital.

Any sound enterprise, large or small, can arrange with C.I.T. for this financial backing, promptly and without lengthy negotiations. The cost of equipment purchases can be amortized over many months; there's no interference with business and working funds are left free for operating use.

This is the time for industry to get in "first licks." If additional capital will help you get off to a flying start, inquire about this newly developed finance plan. Write, wire or phone our nearest office for information without obligation.

CIT The Mark of LEADERSHIP

C.I.T. CORPORATION

ONE PARK AVENUE, NEW YORK 16, N. Y.

333 N. Michigan Avenue
CHICAGO, ILL.

660 Market Street
SAN FRANCISCO, CAL.

In Canada: CANADIAN ACCEPTANCE CORPORATION *Limited, Toronto*

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED



Action and Power with "SUPERSOCKETS"



● When you want *action* and the safety of sure-gripping *power*, you can't beat Williams "Supersockets." These versatile wrenches, with their various combinations of handles, parts and socket types, provide greater speed even under adverse working conditions.

Williams "Supersockets" are available in 5 different patterns, with drives ranging from 1/4" to 1" square. Socket openings range from 3/16" to 2-3/4". Sold by Industrial Distributors everywhere.

J. H. WILLIAMS & CO., Buffalo 7, N. Y.



WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS



- Hi-clearance
- Quick dumping
- Fast hauling
- Semi-trailer with Hi-Speed Tractor
- Short turning
- Power-opened dumping doors
- 17-yard capacity
- Power steer
- Travels 27 m.p.h
- Spreading control
- Interchangeable with Heil Hi-Speed Tractor

HEIL HI-SPEED BOTTOM-DUMP WAGONS

have the quality features that help you establish speed and production records

You can save time and make more money with this Heil Hi-Speed Wagon because it enables you to cut hauling costs . . . increase your yardage output . . . and reduce maintenance expense.

You save loading time because the big capacity cuts spotting delays; the big open top speeds the loading cycle. You can travel up to 27 m.p.h. to the fill — where power-opened doors on the clamshell principle give full opening and pull up entirely out of the way.

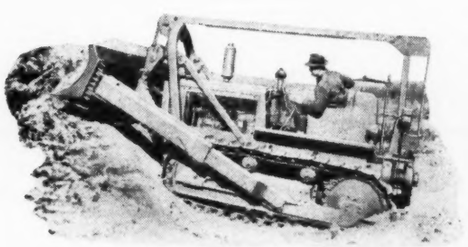
Simple, rugged, Heil quality construction takes the punishment of rough, fast hauling and dumping with minimum maintenance delays. There are no dragging doors to cause trouble.

We list here a dozen reasons why famous Heil Hi-Speed Wagons "pay off" in service and satisfaction — there are dozens more. Write for bulletin giving full details of Heil's advanced design or —

See Your INTERNATIONAL TRACTRACTOR DISTRIBUTOR



Heil Hi-Speed Cable Scrapers carry a heaped 15-yard load.



Heil Cable-operated bulldozers speed dirt-moving jobs.

R-48

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



A different Johnny is marching home

For one thing, he won't parade up Main Street the way you always expected. He doesn't much care for the ticker tape and bunting. By day coach or sleeper, Johnny is coming home with the experiences of battle vivid in his memory.

He may be back for the job he left when the call to colors came. You know you'll be proud and happy to have him with you.

But it's a *different* Johnny. Not quite the happy-go-careless guy you knew before. He's older for one thing. More thoughtful. You may even find him brusque or restless now and then.

Why?

When a man's been through the hell and pandemonium of battle . . . or the terrible boredom of lonely, inactive outposts, it's hard to readjust to a paradise of peace and plenty. It will take Johnny time to settle in a civilian groove, and the call's on you for friendly tact and patience.

Pull with Johnny. Give him time to come through at home, as he came through on the fighting front. Play ball with Johnny. He made a swell soldier. And he's going to make a swell civilian.

MACWHYTE COMPANY, 2941 Fourteenth Avenue, Kenosha, Wisconsin . . . manufacturers of "Hi-Fatigue" Aircraft Cable, "Safe-Lock" Cable Terminals, Aircraft Tie-Rods, Braided Wire Rope Slings, and Wire Rope for all requirements.

We build all 4 Material Handling Buckets

ARMY-NAVY PRODUCTION AWARDS
1st award... July 20, 1942
2nd award .. Jan. 20, 1944
3rd award....July 20, 1944
4th award.... Feb. 17, 1945

PMCO

ALL PURPOSE

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

AMERICA'S MOST COMPLETE LINE OF MATERIAL HANDLING BUCKETS

● **WE BUILD A WIDER AND MORE COMPLETE LINE OF MATERIAL HANDLING BUCKETS THAN ANY OTHER MANUFACTURER.**

See your shovel engineer or equipment dealer about PMCO dippers and buckets.

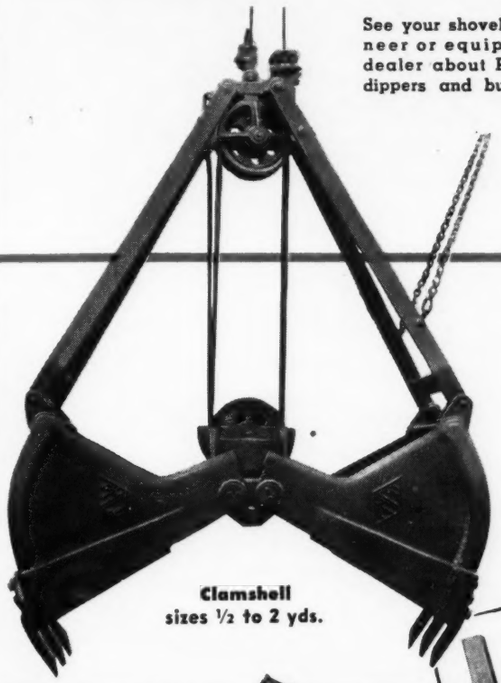
● **WE ARE THE WORLD'S LARGEST BUILDER OF WELDED SHOVEL DIPPERS**—sizes ½ yd. to 18 yds. In certain sizes our volume exceeds that of all other manufacturers combined.

● **EXPERIENCE COUNTS**

Pettibone Mulliken Corp.

"Quality Since 1880"

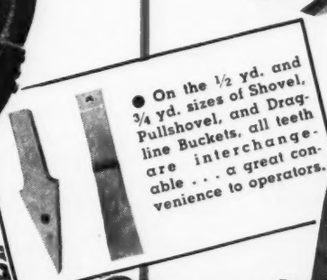
4700 WEST DIVISION STREET, CHICAGO 51, ILLINOIS



Clamshell
sizes ½ to 2 yds.

Pullshovel
sizes ½ and ¾ yd.





● On the ½ yd. and ¾ yd. sizes of Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable . . . a great convenience to operators.



Shovel
sizes ½ to 18 yds.

Dragline
sizes ½, ¾, 1, 1½, 2, 2½ yds.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES

Output Makes 'Em *Fighters!*



A ½-yard 15-B loads trucks on a Southwest Pacific airport job.
(Signal Corps Photo)

Always built to handle tough assignments, Bucyrus-Erie excavators were ready for their role in a two-fisted dirt moving war. That's why they're making such an outstanding performance record on every fighting front and at home. Behind the big output that makes wartime Bucyrus-Eries real fighting excavators are these features that will bring you profits in peacetime:

1. Independent positive twin-rope crowd.
2. Anti-friction bearings.
3. Hook rollers (no center pin).
4. Large diameter boom sheaves.
5. Full mobility with complete steering control.
6. Independent boom hoist.
7. Oil enclosed gears.
8. Field-developed dippers, tiger teeth.

17E45

BUCYRUS ERIE

SO. MILWAUKEE WISCONSIN

AIR PLUS JAEGER COMPRESSOR

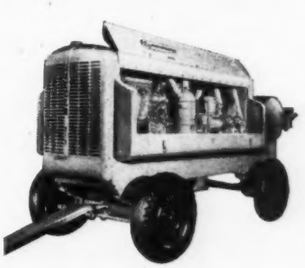


Above compressor is one of a fleet recently furnished to the CITY of PHILADELPHIA

Truck-mounted "AIR PLUS" units, in 60 to 500 ft. sizes, are "traveling workshops" for contractors, cities, counties, utilities

Here is another use for the most advanced line of air compressors in America. Note wide over-all platform providing walkways and multi-purpose work benches on both sides of the compressor with ample space to mount all such service tools as vises, sump pump, light plant, hose reel, air-driven grinder and winch for conduit and sewer work.

We can install this mounting on any make of truck, complete with integral fenders and running boards, or furnish drawings for field fabrication. Plain mounting, without platforms, can also be furnished if desired. Send for Catalog describing the complete line of "AIR PLUS" Compressors with truck, trailer, tractor, skid and stationary-mountings; gasoline, diesel or electric powered.



Jaeger Compressors are micro-precision built for smoother, cooler operation—greater fuel economy, more years of dependable service.

THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus 16, Ohio.

REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. — 226 N. LaSalle St. CHICAGO 1, Ill. — 235-38 Martin Bldg. BIRMINGHAM 1, ALA.



"FLEET-FOOT" Loaders



"SPEEDLINE" Concrete Mixers



"SURE PRIME" Contractors Pumps

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

Bethlehem Steel

for

POST-WAR HIGHWAYS

It's going to be a huge post-war job, building the new highways needed by a growing America, carrying out hundreds of construction projects that had to lie fallow during the wartime years.

When the job begins, Bethlehem's complete line of highway products will again be at the service of road builders. Bethlehem road steels, backed by years of experience, have proved themselves — they're engineered all along the line for sturdy performance.

Plan to handle your post-war highway contracts by specifying this reliable source of supply for *all* road-steel products. Contractors can save time, bookkeeping and letter-writing by placing one order for all their needs for a given highway job with a conveniently-located Bethlehem warehouse. For full information about Bethlehem Road Steel Service, get in touch with the nearest district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.



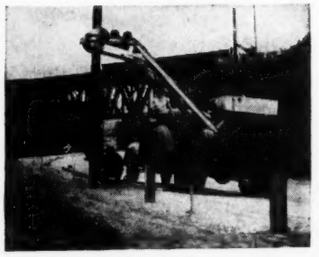
REINFORCING STEEL

Bethlehem *Reinforcing Bars,* plain and deformed, are made of new billet steel in standard sizes and grades, and can be bent to shape and cut to size in most Bethlehem warehouses. *Bar Mats,* made of deformed bars clipped together, are easy and convenient to install, and lie flat. *Welded Wire Fabric* is fabricated from tough, cold-drawn wire to meet all standard highway specifications.



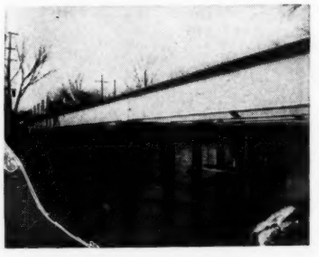
HIGHWAY GUARD

Bethlehem's beam-type guard rail, called the *Safety-Beam,* is made in standard 12 ft., 6 in. lengths, or if preferred, can be supplied in lengths up to 50 ft. *Cable Guard Rail* is durable three-strand steel cable, with a double-galvanized coating. *Highway-Guard Bracket,* made of high-tensile spring steel, is attached with one bolt to steel or wood posts, and supports three or four cables.



STEEL POSTS

Bethlehem *Steel Highway Guard Posts* are readily driven and have superior resistance to impact and side thrust. Bethlehem also makes posts for right-of-way fence, as well as the fence itself.



STEEL PILING

Bethlehem *Steel Sheet Piling* for temporary or permanent retaining structures. *Steel H-Bearing Piles* for bridges, over- and under-pass, and other load-bearing structures.

BETHLEHEM STEEL

OTHER BETHLEHEM PRODUCTS FOR HIGHWAYS

ROAD JOINTS — DOWELS — DOWEL BAR SUPPORTS
ROAD STRIP — WIRE ROPE AND STRAND — BAR TIES
GUARD RAILS — ANCHOR RODS — RIGHT-OF-WAY FENCE AND POSTS
PIPE — HOLLOW DRILL STEEL — DIGGING BARS
STRUCTURAL STEEL — STEEL CRIBBING MOLD BOARDS
REINFORCING FOR CONCRETE — BRIDGE FLOOR REINFORCING
CORRUGATED SHEETS — CONCRETE SLAB SPACERS
TURNBUCKLES — TIE RODS, SPIKES, BOLTS AND NUTS
TIMBER BRIDGE HARDWARE



If you've had difficulty obtaining delivery of certain LaPlant-Choate models, please remember that dozers and scrapers continue to rate top priority as essential weapons of war. Moreover, again this year, LaPlant-Choate is producing more dozers for the armed forces than any other company in the industry.

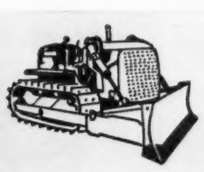
TRADE MARK

THIS MARK ON EQUIPMENT

means Lowest Possible Cost on the Job

Ask any of the thousands of satisfied owners who have used LaPlant-Choate equipment for years—and they'll tell you that you can't beat a LaPlant-Choate rig for saving time and money on the job. This LaPlant-Choate record of performance and economy—proved on tens of thousands of jobs the world over—will be even more evident in the new improved LPC earthmovers now being engineered for thrifty mass production after Victory. So before you buy any new earthmoving or land clearing equipment, be sure to look for the new LPC trademark. Backed by 34 years of *specialized* engineering and manufacturing "know-how", this new mark is your assurance of lowest possible cost per yard . . . per ton . . . per acre. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT



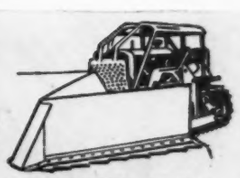
ALL TYPES OF DOZERS— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS— Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.



CABLE OPERATED RIPPERS — For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.



LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.



Rig with *Tiger Brand*

and keep your equipment on the job

LET American TIGER BRAND Excellay Preformed Wire Rope be a factor in reducing your dirt-moving costs.

For example, in scraper wagons rigged as the one shown here, flexibility, abrasion resistance, strength and ruggedness are the requisites for satisfactory service. American TIGER BRAND fills the bill.

Actual on-the-job comparisons by contractors and engineers prove the superiority of U·S·S American TIGER BRAND Excellay Preformed Wire Rope.

It has greater stamina. Is more flexible. Doesn't kink easily. Lasts longer. All of which means less time lost on shutdowns for repairs and replacements. In other words, a more profitable operation for you—all the way through.

Whatever your hauling or hoisting job, you'll find an American TIGER BRAND Wire Rope built for the purpose.



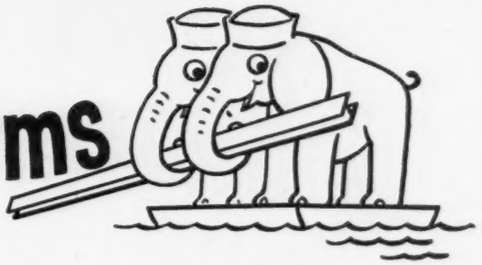
Excellay Preformed

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago, and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York
UNITED STATES STEEL

USS STEEL UNITED STATES STEEL

U·S·S American TIGER BRAND Wire Rope

These Naval Pachyderms







OFFICIAL NAVY PHOTOGRAPHS

move the burdens of Victory

Osgood Mobilcrane (lifting battleship anchor) and General Supercrane (with service boat) on the job at Bremerton Navy Yard and Keyport Torpedo Station.

Navy building of ships and ordnance to go with them is vital to Victory. And at the great Navy Yard at Bremerton, and its affiliated Torpedo Station at Keyport, vast tonnages of heavy, cumbersome materials must be constantly on the move to provide the weapons of war—on time.

Contributing to the speedy efficiency of these and many other shipyard operation bases are Osgood Mobilcranes and General Supercranes. These powerful, versatile, "mechanical beasts" are forever on the job—lifting, hauling, positioning — everything from steel hull plates to prefabricated deck sections.

More specifically in terms of your own requirements, put these facts in your post-war equipment file:

- ★ **Mobilcranes and Supercranes ride on rubber tires, reducing to a minimum wear and tear on roads, docks and runways; require no special rails or tracks.**
- ★ **One man to drive and/or operate the crane, thus saving manpower and money.**
- ★ **One engine does the work; moves the outfit, operates the crane, saves fuel.**
- ★ **Mobilcranes and Supercranes are world-famous for ruggedness, power, ease of control and maneuverability.**

Write for complete data covering your operations . . . be prepared for "new equipment day."

ONE-MAN CONTROLLED • ONE-ENGINE OPERATED • RUBBER-TIRED

THE OSGOOD CO. MOBILCRANES

CRANES - SHOVELS MARION OHIO OSGOOD GENERAL

THE GENERAL EXCAVATOR CO. SUPERCRANES

MARION, OHIO

* Williams Brothers Corp., Tulsa, Oklahoma, has recently completed for the Louisville Gas & Electric Company the construction of 58 miles of 8 inch natural gas pipe line and 7 miles of 12 inch line. With the help of Gulf quality lubricants and fuels, the project was finished well ahead of schedule.



"Gulf Quality Products and Fine Service

helped us finish this pipe-line job well ahead of schedule"—

says Superintendent G. S. Connors

IT required top-notch performance from equipment to finish this big pipe-line project well ahead of schedule! That's why job Superintendent G. S. Connors of Williams Brothers Corp.* gives a sizable share of the credit for their fast progress to Gulf lubricants, fuels, and prompt delivery service.

Like so many other leading contractors, Williams Brothers Corp. has found that Gulf lubricants provide a higher degree of protection to equipment when it is pushed to the limit—and that Gulf fuels contribute to maximum power and efficiency. Result: fewer delays, lower maintenance costs, better all-round equipment performance, and a speedier, more profitable job!

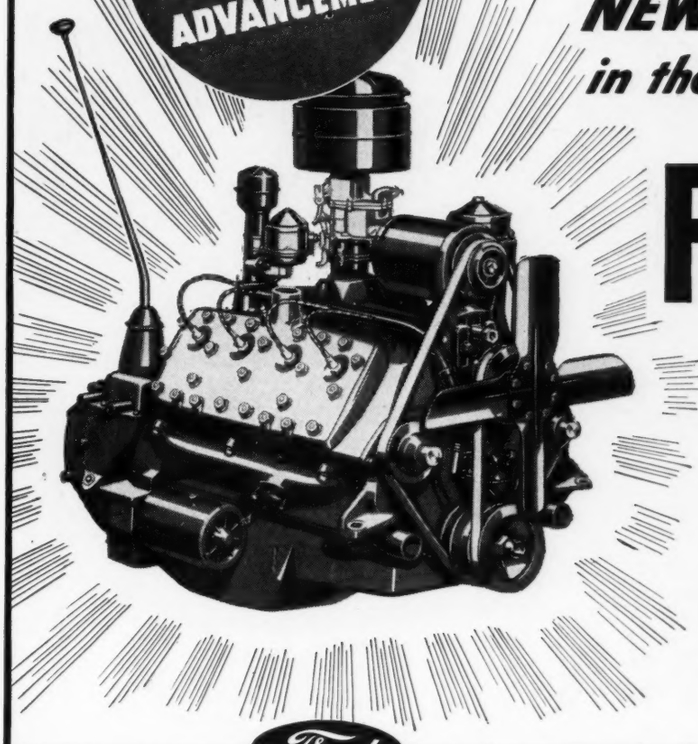
Write, wire, or phone your nearest Gulf office now and arrange to use Gulf quality lubricants and fuels on your next job. They are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico.

Gulf Oil Corporation
Gulf Building

GULF

Gulf Refining Company
Pittsburgh 30, Pa.

AN IMPORTANT ENGINEERING ADVANCEMENT



Ford Announces

NEW DEVELOPMENTS

in the Heavy Duty 100 H.P.

FORD V-8 TRUCK ENGINE

Ford

Here's Good News

FOR TRUCK OPERATORS

The Model 59 engine is now offered as original equipment only. It will eventually be made available as a service replacement in Ford Trucks and Commercial units already on the road.

Here are some of the important improvements in this engine:

NEW long-life Tri-Alloy connecting rod bearings . . . **NEW** aluminum alloy pistons with four rings for oil economy . . . **NEW** larger capacity oil pump with more screen area for improved lubrication . . . **NEW** crankshaft rear bearing oil seal . . . **NEW** rust-proofed valve springs . . . **IMPROVED** cooling of valve seats . . . **NEW** flat-type waterproof distributor with full automatic advance and vacuum control . . . **NEW** high efficiency fan . . . **IMPROVED** carburetion . . . **IMPROVED** intake manifold for easy vacuum pipe connections . . . **SIMPLIFIED** design provides easier accessibility for service . . . clutch can be replaced without removing oil pan . . . more parts are interchangeable, reducing the number of service items required.

IT'S HERE—the first of wartime truck engineering developments by Ford to be made available to civilian operators.

An improved Heavy-Duty, 100 H.P. V-8 Engine now powers Ford Trucks and Commercial units which are in limited production for civilian priority holders.

This great power plant is the Model 59. You'll be hearing a lot about its fine qualities. It includes many of the Ford Truck engineering advancements made in response to military needs which are proving valuable in civilian trucking.

These improvements, affecting virtually every operating part of the engine, raise Ford Truck engine performance to new high levels of stamina, economy and efficiency—with new and important *service* benefits of interest to every truck owner and maintenance man.

Read about them in the text at the left.

FORD MOTOR COMPANY



PATTERN FOR PULLING POWER

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG
for all rock work

ALL-WEATHER EARTH-MOVER
for drawn vehicles

How much you haul — and how fast — is what sets the pace for profit on your construction jobs. So drive-wheel tires *must* grip and pull to keep today's bigger yardages moving on schedule.

That's the prime reason why more and more contractors buy Goodyear Sure-Grips for their drive wheels. For this great worker is powered with Goodyear's *open center* tread that gives each husky cleat an entering edge all along the center of the tread. That permits the whole of each lug to dig in deeper and cleaner, take firmer hold in the ground and provide steady, maximum traction under all conditions.

And with no closed corners to trap mud, it's a *true* self-cleaning tread. Those wide, unblocked channels sluice out dirt, mud and stones and leave the sturdy lugs free and clear to bite deep and pull better every time.

Now superarmored with Goodyear's patented Rayotwist cord — *which makes the strongest body we've ever used in a work tire* — these really tough huskies are the finest off-the-road tires that can be built from today's synthetic and permissible natural rubber.

Get Goodyears on your units and you'll soon know why *"more tons are hauled on Goodyear truck tires than on any other kind."*

Sure-Grip, Rayotwist, All-Weather—T. M.'s The Goodyear T. & R. Co.

THE GREATEST NAME IN RUBBER

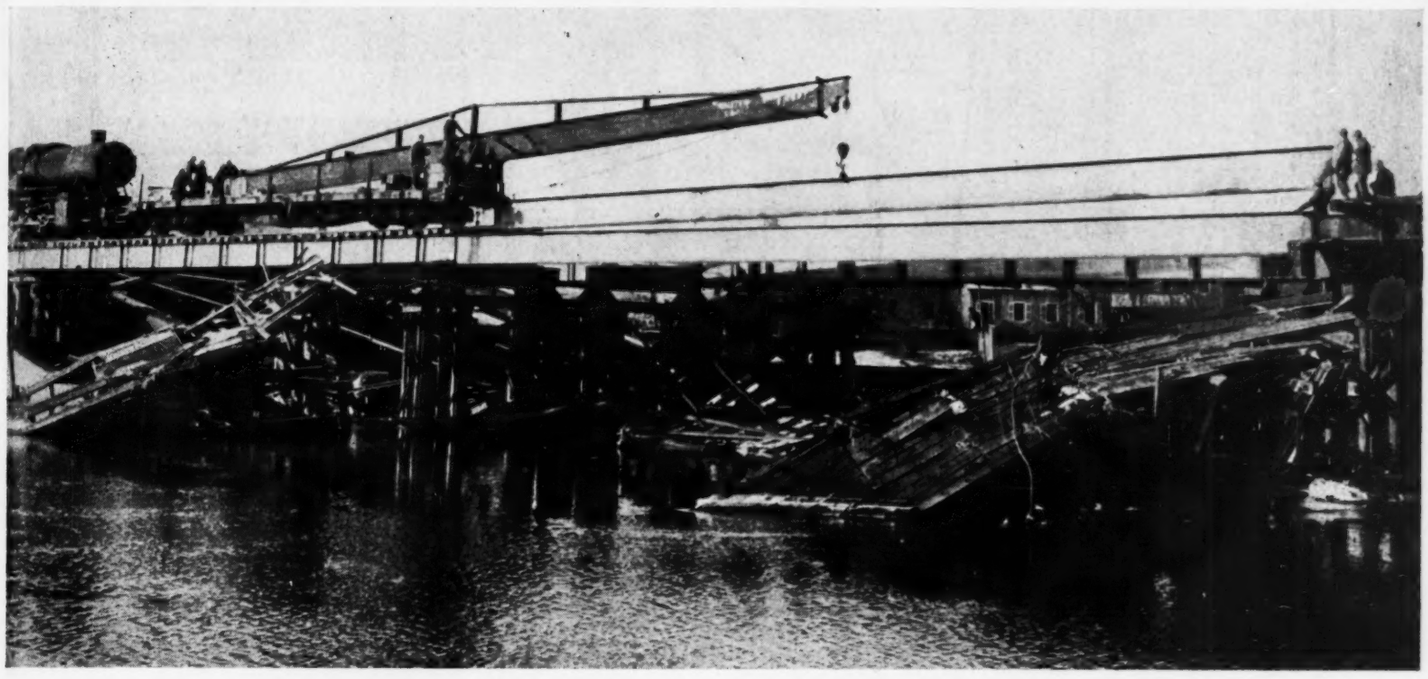
GOODYEAR

SEND THE 7TH SOARING — BUY MORE WAR BONDS!

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 27 | JUNE, 1945 | Number 6



ON 60-TON RAILWAY FLATCAR is mounted 100-ft. I-beam, with 50-ft. overhang on front end, for erecting bridge girders.

Long-Reach Traveler

PLACES 100-FT. I-BEAMS IN ARMY BRIDGES IN EUROPE

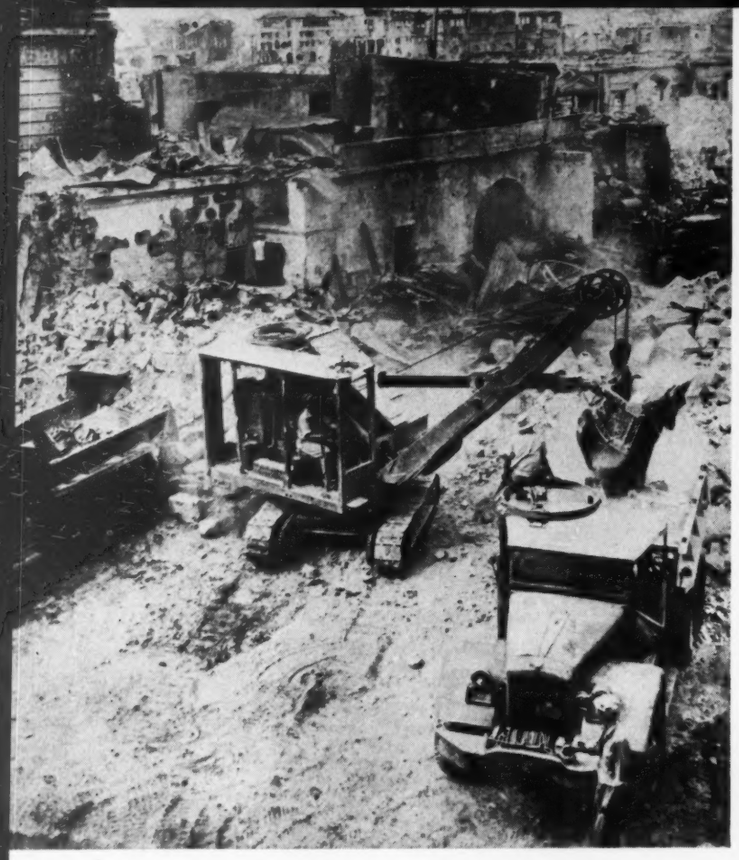
RECONSTRUCTION OF VITAL RAILROAD BRIDGES to speed Allied supply lines through Germany has been accelerated by the development in the European Theater of Operations of what the U.S. Army Engineers call the "Monster," a launching device that can place a giant steel beam into position within half the normal time. Constructed by inventive Engineers for a rush bridging job on the Moselle, this equipment has launched six 100-ft. meter beams (I-beams 1 meter in depth) in 90 min., a job that usually requires about 3 hr., and has lifted into place completely prefabricated bridge spans up to 50 ft. in length.

Assigned to the job of reconstructing the demolished railroad bridges at Thionville, Capt. Lindley P. Murray, of the 347th Engineer General Service Regiment, found that 20-ton cranes could not be moved into position to swing 100-ft. beams across the spans. In a conference with S/Sgt. Ray O. Burton, construction foreman, the captain developed designs of the type of launcher required for the job. The sketches had the general outline of a monster railroad gun. Called into the session, Sgt. Herbert Hinkhouse, squad foreman from West Liberty, Ia., looked over the sketches and figured he could rig up something that would work. Captain Murray assigned a welding squad for the job.

Selecting a 60-ton flatcar with heavy trucks, Sgt. Hinkhouse and his squad mounted a 100-ft. meter beam, elevating the front and placing it to allow a 50-ft. overhang in front of the car. For power they mounted a 5-ton multiple gear winch. A mate for the "Monster" was later constructed.

"The finished job was a strange looking contraption," said Captain Murray. "But it worked. In fact, we were able to launch long beams faster than ever before. Now the 'Monster,' shown in the accompanying illustration, is our prize piece of equipment in constant demand by other companies of the regiment for special jobs."

THIS MONTH'S NEWS REEL



RECONSTRUCTION IN PHILIPPINES is under way as U. S. Army power shovel, bulldozers and trucks help clear wreckage and debris from ruined buildings in Manila. Press Association Photo

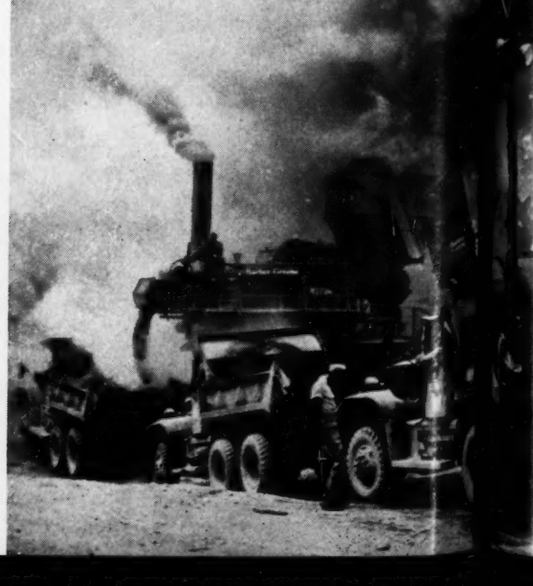
Page 56

POST-WAR ACTIVITY of American Society of Civil Engineers steps up to faster pace as Committee on Post-War Construction (below), meeting in Chicago, begins intensified campaign, in cooperation with Committee for Economic Development, to stimulate in local communities throughout the nation complete preparation of projects for post-war construction, with special emphasis on privately financed projects. Society's Board of Direction gives strong support by approving increased budget and confirming appointment of Oscar L. King to serve as director, starting May 1, of committee's nation-wide promotional program, activated through 64 local sections of the society in collaboration with 2,800 community organizations of C.E.D. Present at Chicago meeting are, left to right: (lower row) MARK B. OWEN, former director, resigned to join Russell B. Moore Co., consulting engineers, Indianapolis; CHARLES T. LEEDS, Los Angeles; G. DONALD KENNEDY, committee chairman, Washington, D. C.; JOHN C. STEVENS, president, Am. Soc. C. E.; MALCOLM PIRNIE, chairman, Construction Action and Advisory Committee, C.E.D.; GEORGE T. SEABURY (since deceased), secretary, Am. Soc. C. E.; (upper row) ADOLPH J. ACKERMAN, Pittsburgh; FRANK T. SHEETS, Chicago; E. LAWRENCE CHANDLER, Washington representative of society and secretary of committee; GUSTAV J. REQUARDT, Baltimore; E. C. L. WAGNER, Jefferson City, Mo.; and DEAN G. EDWARDS, New York. Missing from picture is Vincent B. Smith, consultant to committee and associate editor of "Construction Methods," photographer for the occasion.



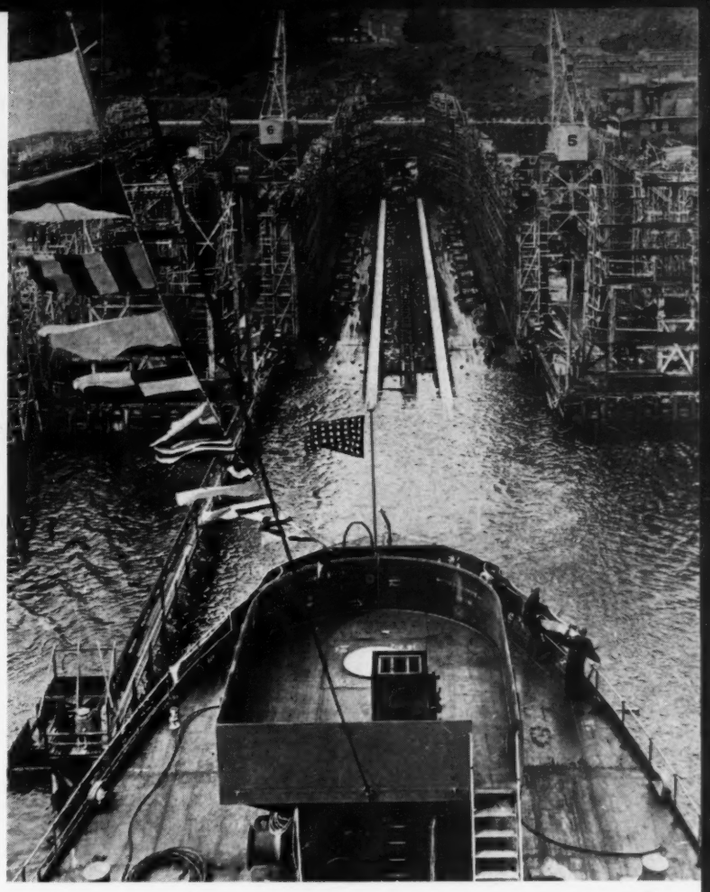
OIL PIPELINE is reconditioned by Smith Contracting Co., of Fort Worth, Tex., for Shell Pipe Line Corp. between McCamey, Tex., and Cushing, Okla. Here Caterpillar tractors with sidebooms remove line from ditch, clean, spot weld, patch, rewrap, repaint and return it to ditch without interrupting flow of oil.



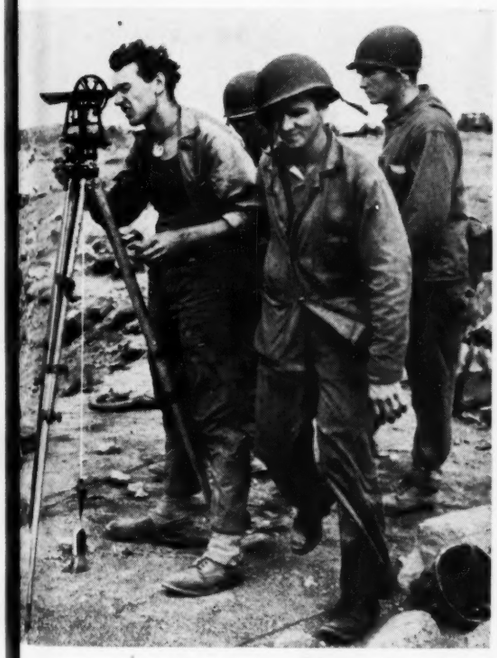




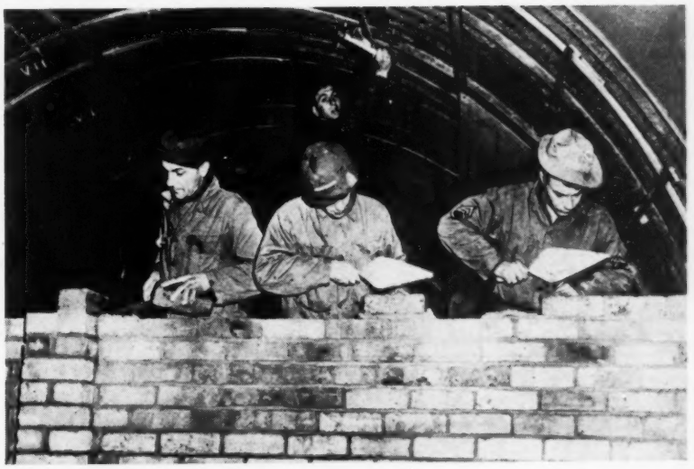
SHIP-TO-SHORE PIPELINE for unloading petroleum products from tankers is constructed by U. S. Engineers in France. Here members of petroleum operating unit tighten joints while men in background lift flexible header into place.
Army Signal Corps Photo



→ **COMPLETED IN 59 DAYS,** "Elwood Hills," 8,250 - hp. turbo - electric tanker, is launched in San Francisco Bay. Built by Marinship Corp., Sausalito, Calif., it was delivered to U. S. Maritime Commission in less time than any other tanker of comparable size.



← **ENGINEER'S TRANSIT** is employed by survey crew of U. S. Marines to check points for artillery in battle for Iwo Jima.
U. S. Marine Corps Photo



→ **BOMBED - OUT BRITISH** are provided with prefabricated homes built with aid of 3,000 U. S. Army Engineers and lend-lease. Most popular temporary dwelling is 17 ft. wide at base and 17 ft. long. Here skilled Army Engineer bricklayers brick up end of Nissen hut type house.
Wide World Photo

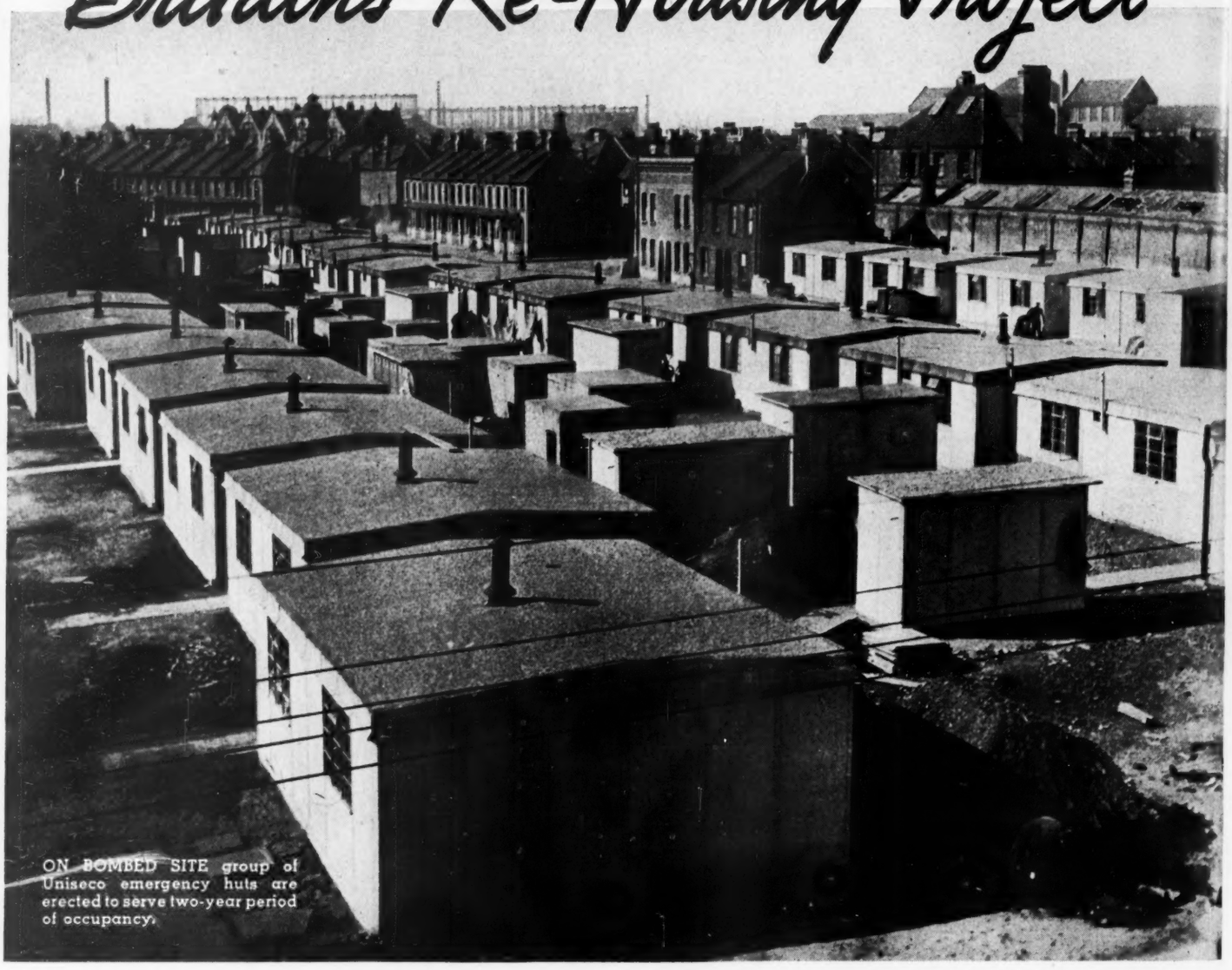
B-29 BASE ON GUAM (below) is surfaced with materials mixed in Barber-Greene asphalt plant in jungle. Approximately 30,000 tons of crushed rock and 400,000 gal. of asphalt were required for one runway and 3½ mi. of taxiway. Acme Photo

CULVERT PIPE (below) of corrugated metal is installed by Chinese, under supervision of U. S. Army Engineers, to provide drainage facilities on Ledo Road in Burma. Route connecting with Burma Road and forming link between India and China was recently completed and opened to traffic.
Army Signal Corps Photo





Britain's Re-Housing Project



ON BOMBED SITE group of Uniseco emergency huts are erected to serve two-year period of occupancy.

Will Provide Emergency Shelter for Bombed-Out Home Owners Pending Post-War Construction of Permanent Type

THE WORLD'S GREATEST RE-HOUSING PROJECT is now under way in Great Britain. The task is stupendous—202,000 houses in the United Kingdom have been entirely destroyed since the war began, 255,000 more rendered uninhabitable, and a further 4,073,000 damaged less seriously up to Sept. 30, 1944, before the V-2 rockets began. The total figure—more than 4,530,000—is over one-fourth of the 13½ million British houses standing in 1939.

During the war, of course, there has been an almost complete ban on the erection of new houses in Britain, and facilities for repair and maintenance work to existing houses have been severely curtailed. No more than $40 per year can now be spent on repairs to an individual house except by special governmental permit.

With thousands of Britons left homeless, and millions more living in damaged houses, the British Government has started work on plans to meet the emergency. The first job to be tackled was the repair of damaged dwellings to the stage where they are habitable. Next, prototypes of huts and prefabricated houses of various types have been constructed; these will be used as a stop-gap until permanent homes can be constructed. Finally, plans are under way for the construction of permanent houses when labor and materials have been released from the war effort.

Perhaps the best illustration of the tremendous job before Britain is the

FACTS AND FIGURES

in this article are from

BRITISH INFORMATION SERVICES

an agency of the British Government



PERMANENT REPAIRS are being made on roofs of these buildings as workers lay tiles on purlins.



PERMANENT REPAIRS are made by mason laying up brick to restore one wall of this West Ham, London, house which was destroyed by bombs.

British Official Photos



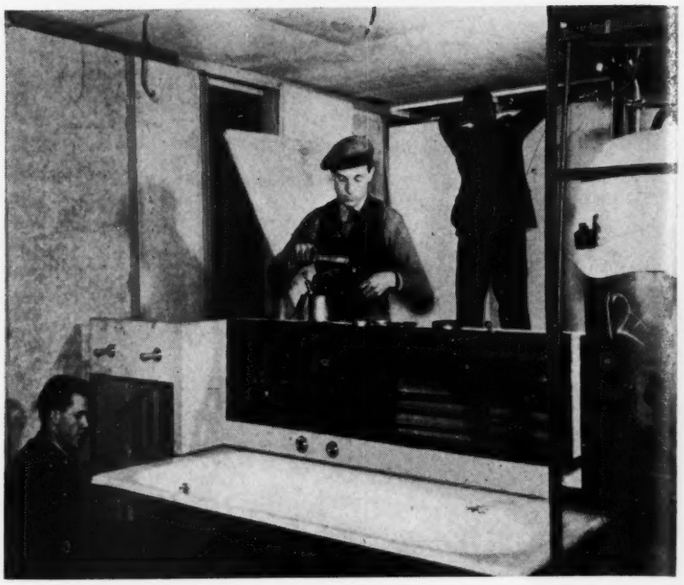
FIRST-AID REPAIR is administered to house in West Ham, London, by covering shattered roof with weighted tarpaulins and closing window openings from which glass has been blown out.



WINDOW OPENINGS from which glass panes have been blown out by bombing are fitted with temporary coverings at Seven Kings, London. Permanent repairs will be made later.



SECOND STAGE OF REPAIR is reached by these dwellings at West Ham, London. Walls are being rebuilt and houses are being roofed temporarily with felt held down by laths.

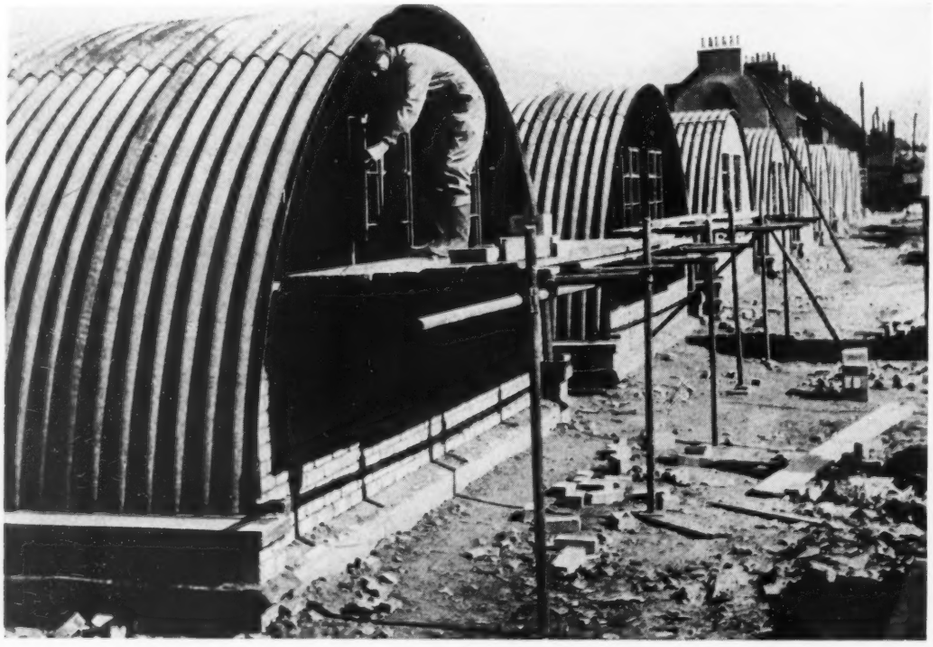


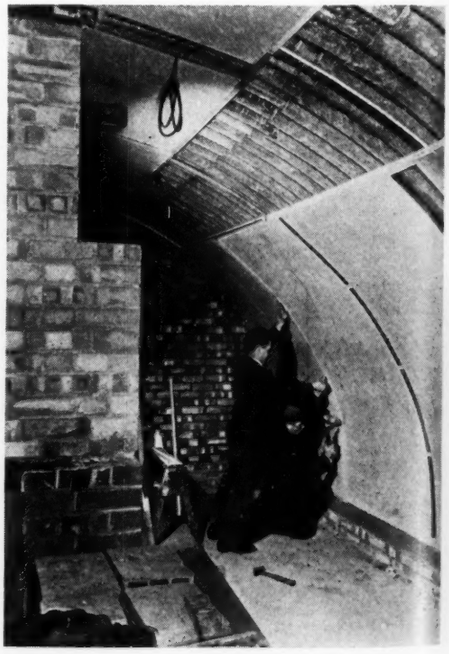
UNISECO EMERGENCY HUT has prefabricated plumbing unit in bathroom-kitchen section. At right is boiler heated from two sources: fire in living room and electric emersion heater.

area of Greater London, worst hit of all districts in the United Kingdom. On March 31, 1945, the London Repairs Executive, set up by the Government to coordinate the vast task of repairing London's bomb damage, had well passed its winter target of rendering 719,300 houses habitable and was ready to begin the next stage of more permanent repairs.

Toll Taken by Bombing—Up to the spring of 1944, enemy bombing had totally destroyed 84,000 London houses. Repairs were still needed on 142,000 damaged homes, 42,000 of them uninhabitable. Then in June Hitler directed his flying-bombs on southern England, and during the 80 days of these attacks 23,000 more London houses were demolished and 1,104,000 damaged. This made a total of 107,000 houses destroyed, leaving some 500,000 Londoners homeless. Of the 1,104,000, about 170,000 were badly damaged, and some 700,000 homes have received first-aid repairs, but need further work to make them reasonably comfortable. The remainder were less seriously damaged.

In order to reach last winter's target of 719,300 repaired houses, the utmost economy in the use of building materials was necessary. Wherever possible old slates had to be used for mending roofs; if no slates were available, asbestos sheeting, corrugated iron sheets, concrete tiles and reinforced felt were used. In spite of trebled production, plasterboard is in such short supply that its use was forbidden for temporary repairs, window replacements or for covering partitions and walls. The shortage of clear sheet glass meant that only 50 percent of windows could be glazed. Provincial firms produc-





NISSEN HUTS are built of curved sheets of corrugated asbestos on concrete foundations, with end walls of brick masonry. Interiors are lined with plain asbestos sheets.



WALL SECTIONS are raised into vertical position during construction of Uniseco emergency hut at Poplar, East London.

ing building material and tools have been asked to transfer themselves to London, lock, stock and barrel.

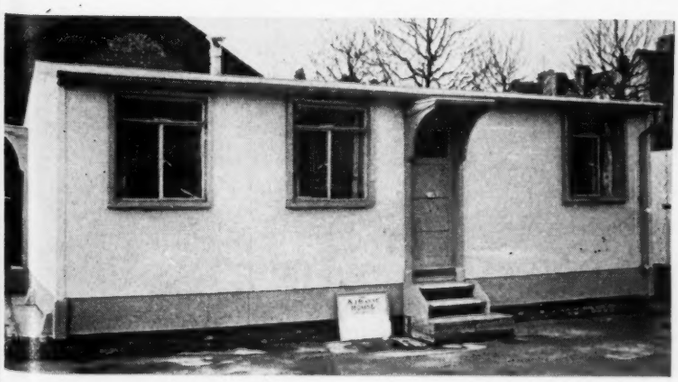
Repair of bombed houses is carried out in three stages. If the roof is blown off, a special Ministry of Works repair squad is rushed to the spot to do a "field dressing." This consists of covering the roof with tarpaulin, refixing doors and filling in the window-frames with cellophane or paper-backed cotton "scrim."

The second repair stage—applied to the 719,300 houses mentioned above—consists in making a sufficient number of rooms reasonably comfortable. "Keeping the warmth in and the weather out" is the way a building executive puts it. This often means new ceilings, sometimes new walls, the glazing of windows, re-tiling of roofs and strengthening of the general structure.

The third stage, only now beginning, consists of full permanent repairs, though no decoration. It will probably be a long time before British homes are brightly painted, before they will have wallpaper or even a coat of whitewash on their walls.

All this work has been accomplished despite critical shortages of manpower and materials. On June 15, 1944, when the first flying-bomb hit London, only 21,000 builders were working in the capital. Many pre-war operators were serving in the armed forces, hgundreds more had been drafted to build

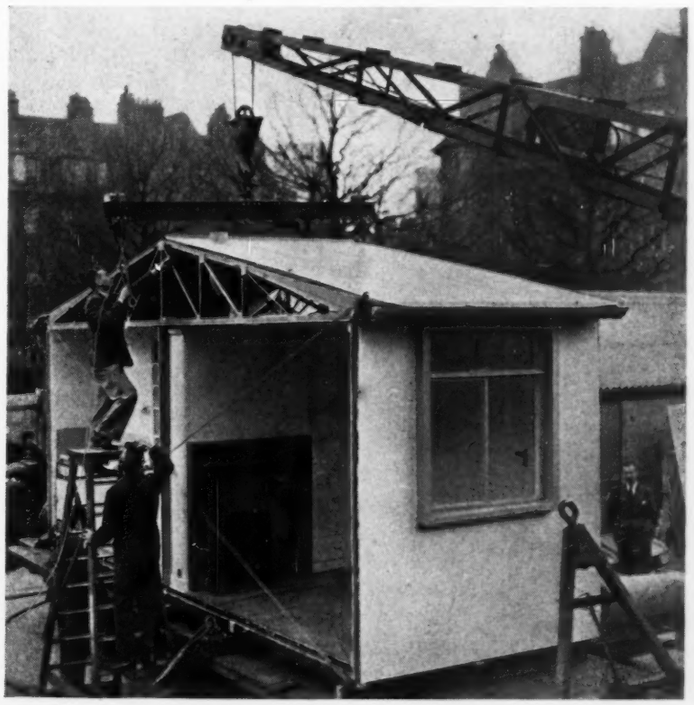
(Continued on page 158)



COMPLETED HOUSE of Airoh aluminum type is one-story structure built of four prefabricated sections.



WRECKAGE OF BUILDINGS demolished by German bombs falling in London suburb are revisited by former occupants who search in rubble for their purses, ration books and identity cards.



ALUMINUM HOUSE of Airoh (Aircraft Industries Research Organization on Housing) prefabricated sectional design will go into production as soon as factory capacity can be allotted. House is prefabricated in four sections joined at site by interlocking fastenings.

Step-by-Step Field Methods

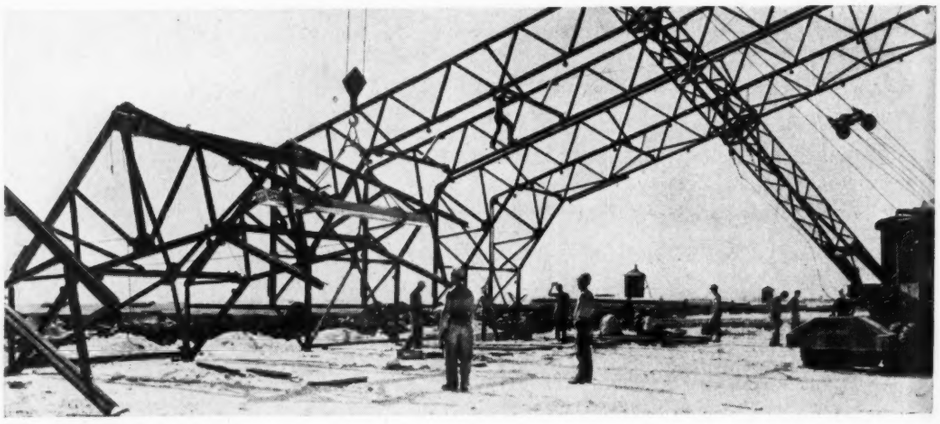
CANVAS-COVERED HANGAR Has Steel Trusses Erected By Engineers on Saipan

A CANVAS-COVERED HANGAR has been constructed by Aviation Engineers of the U. S. Army on Saipan in the Marianas. Light-gage steel trusses of the three-hinge arch type, mounted on concrete footings and held in place by a horizontal steel span form the frame of the 10-bay portable hangar. The covering is made of canvas sections laced together on the ground and raised to position by means of ropes and pulleys on the underside of the structure. Erected according to the standard plans of the Butler Manufacturing Co., Kansas City, Mo., it is 130 ft. wide, 160 ft. long and 39 ft. high.

The hangar was constructed on a 6-in. coral surface. Footings were 4 ft. 3 in. square and 1 ft. thick. Steel cables were strung at the windward end to provide a wind break for the canvas curtains. The cable used was ½-in. steel with turnbuckles added on each end.



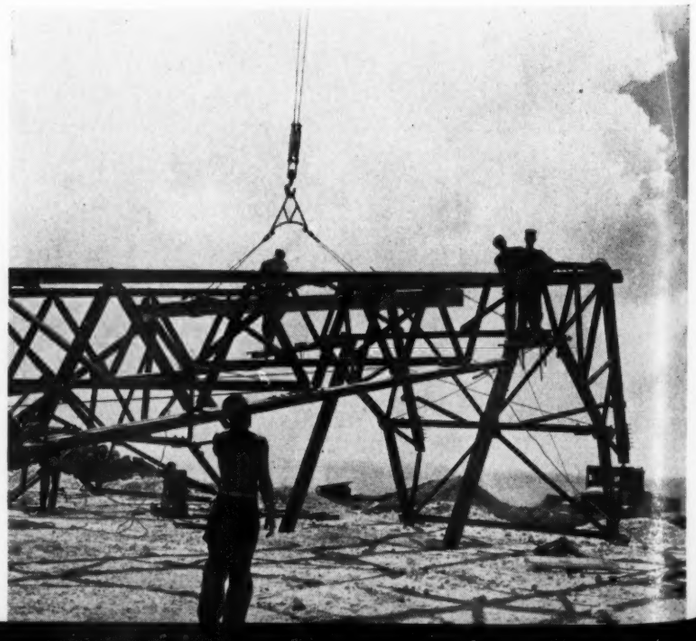
1 PNEUMATIC DRILLS are used to excavate pits for concrete footings. Footings are 4 ft. 3 in. square and 1 ft. deep.



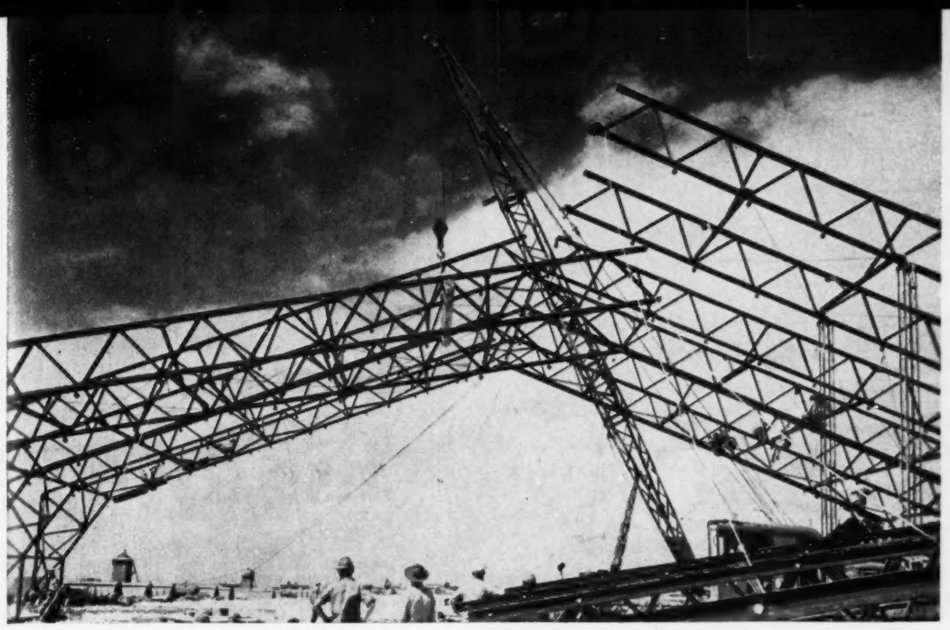
2 STEEL TRUSSES (below) are anchored to concrete footings. Trusses are of three-hinge arch type, with lower hinges on footing pads, which are connected by series of tierods coupled by turnbuckles with clevis at each footing pad plate.



3 TIMBER IS LASHED to underside of top chord of truss and crane lifts on it at two places to reduce bending when raising truss.



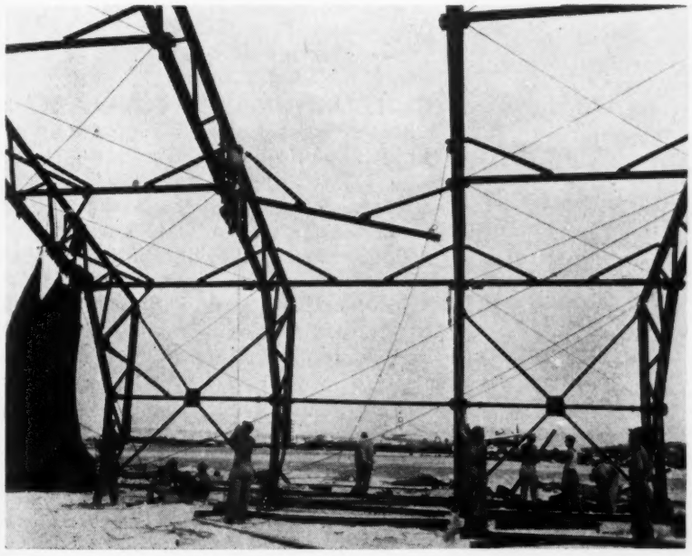
4 WINCH on 2½-ton truck holds truss in position while center span is raised.



5 CENTER SPAN is raised into position by Lorain truck-crane.



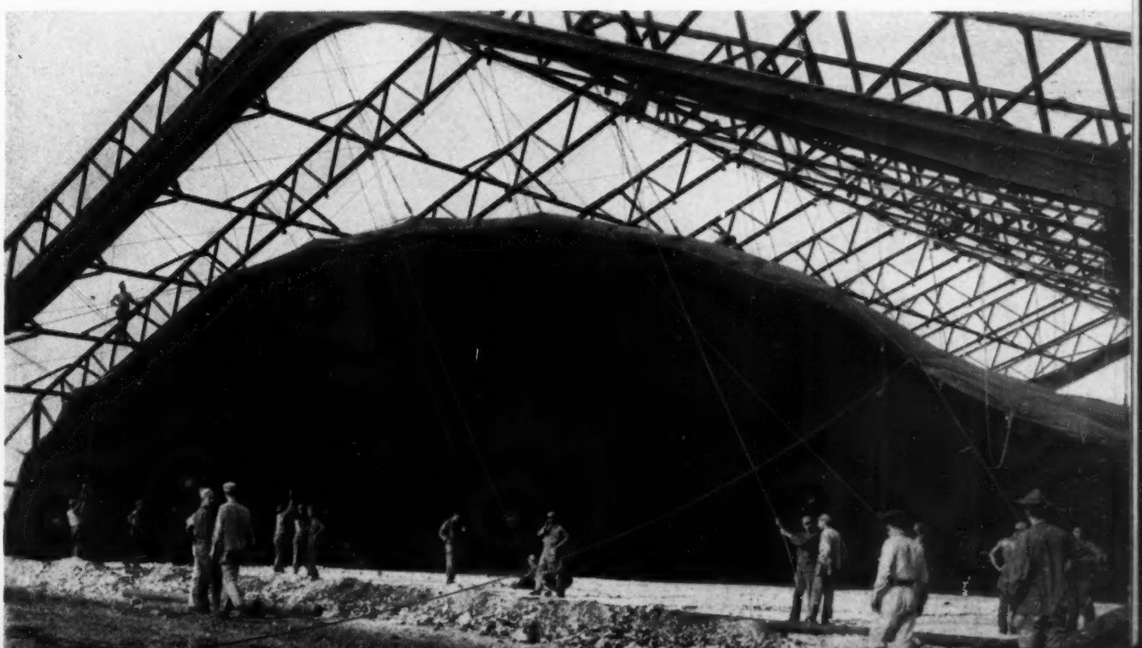
6 SIDE TRUSS is joined to center span.



7 LONGITUDINAL BEAM is erected to hold trusses in place and frame is threaded for canvas.



8 ROPE IS THREADED through frame preparatory to raising canvas which is laced together in sections on ground.



9 CANVAS is raised to position by means of ropes and pulleys on underside of hangar.

Contractor Fabricates Equipment

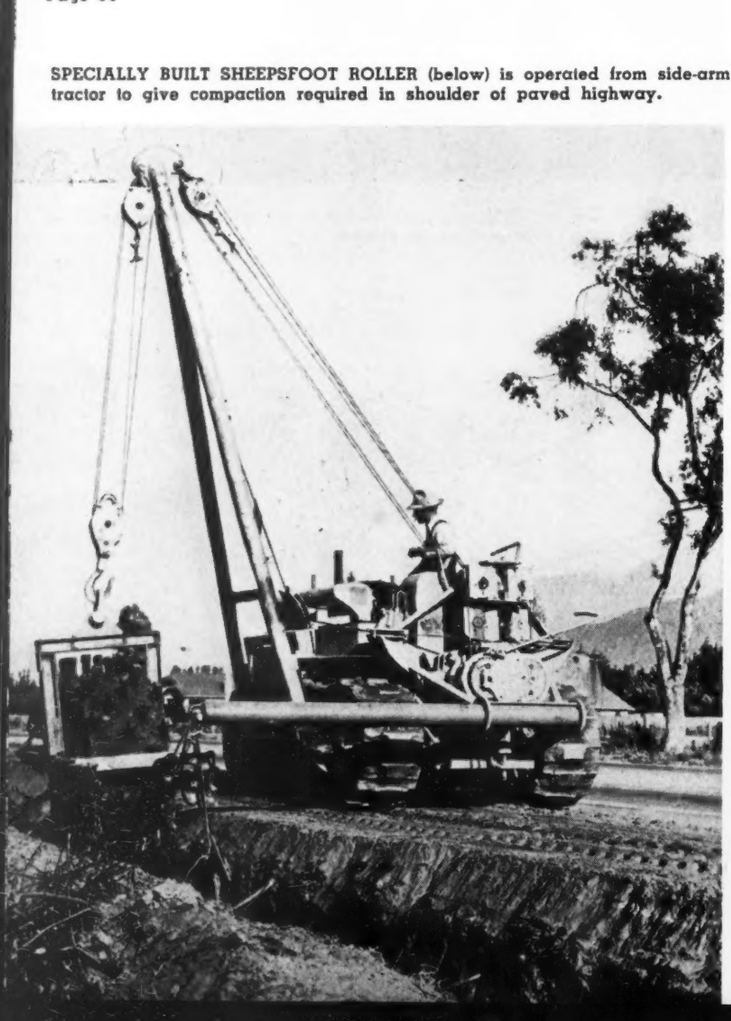
To Speed Construction of 90-MILE WELDED GAS PIPELINE



SECTION OF 18-IN. LINE is lowered into trench by pair of tractors working about 100 ft. apart.

CONTRACTOR-BUILT EQUIPMENT facilitated operations in constructing a welded steel pipeline 90 mi. long, 16 and 18 in. in diameter, from the La Goleta oil fields north of Santa Barbara, Calif., to Los Angeles. Built to carry natural gas in either direction under pressures up to 1,000 psi., the line cost about $3,900,000 and has a capacity of 165,000,000 cu. ft. per day. Improved construction methods and equipment were developed

SPECIALLY BUILT SHEEPSFOOT ROLLER (below) is operated from side-arm tractor to give compaction required in shoulder of paved highway.



WRINKLE BEND (below) is made with torch on long unsupported span to give desired curvature and relieve bending stress.



for work on parts of the pipeline, which had to be built under sidewalks, lawns and paved streets, across mountains, canyons and farm fields, under rivers, and along secondary and primary state highways. The work was done as a joint venture by the Pacific Pipeline Construction Co. and the Pacific Crane & Rigging Co., Inc., both of Los Angeles.

Right-of-way was cleared and graded to 30-ft. width. In the mountain section this work often involved building access roads and moving large quantities of earth in sidehill cuts, a rough grading job done by bulldozers. All pipe, hauled by the Belyea Truck Co., was delivered along the right-of-way in 40-ft. lengths. A tractor with a side boom was used to line up sections for the first welding crew. Because side booms could not be found for equipping a sufficient number of tractors, the contractor fabricated nine welded booms of 9-in. steel pipe and installed them on Caterpillar tractors with power takeoff units. These homemade booms proved satisfactory and were used throughout the job.

All welders were required to pass a test before they were put to work. The welding was done with Lincoln 200- and 300-amp. welding machines and Fleetweld No. 5 rod. Two welders with the line-up crew ran the stringer bead, and other welders finished the weld by running two or three more passes.

After the pipeline had been welded into long continuous sections, "caravans" of specialized equipment moved along the line successively working on it and treating it. It was first cleaned with power-driven wire brushes and cutters

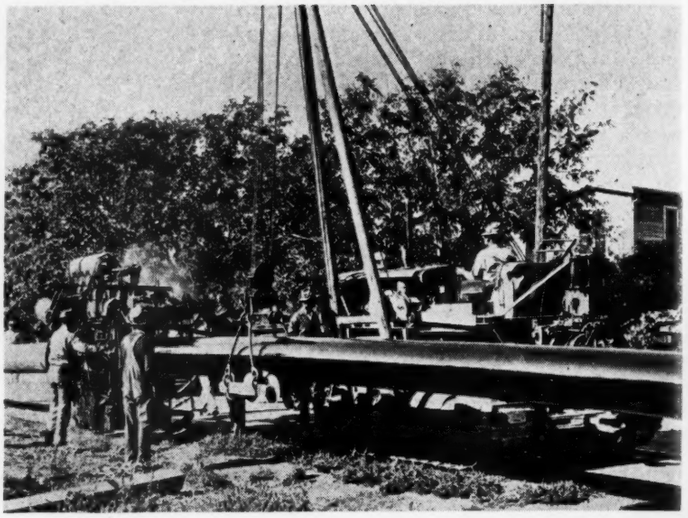


DITCHING MACHINE works uphill on right-of-way of 18-in. line near city of Ventura.

UNSUPPORTED SPAN (below) crosses deep canyon. Cable from tower at right is used during construction and then removed. Longest crossing has 420-ft. span with no external means of support.







HOT COAL TAR ENAMEL and spiral wrapping of asbestos felt are applied to pipe after cleaning and priming.

←

TWO PIPES of 14-in. dia. are buried 8 ft. under streambed to cross Santa Clara River at Saticoy.



SPECIAL BEVEL CUTS are made in pipe at angle points with torch.

that removed scale and rust from the entire exterior surface. This and the priming operation were done with the same machine. As soon as the priming coat was thoroughly dry, a layer of Barrett coal-tar enamel was applied hot and two spiral layers, wound in opposite directions, of Johns-Manville asbestos-felt protective coating were put on. The interior surface was given a thorough cleaning by small steel particles driven through the line with a flow of natural gas under 400-psi. pressure.

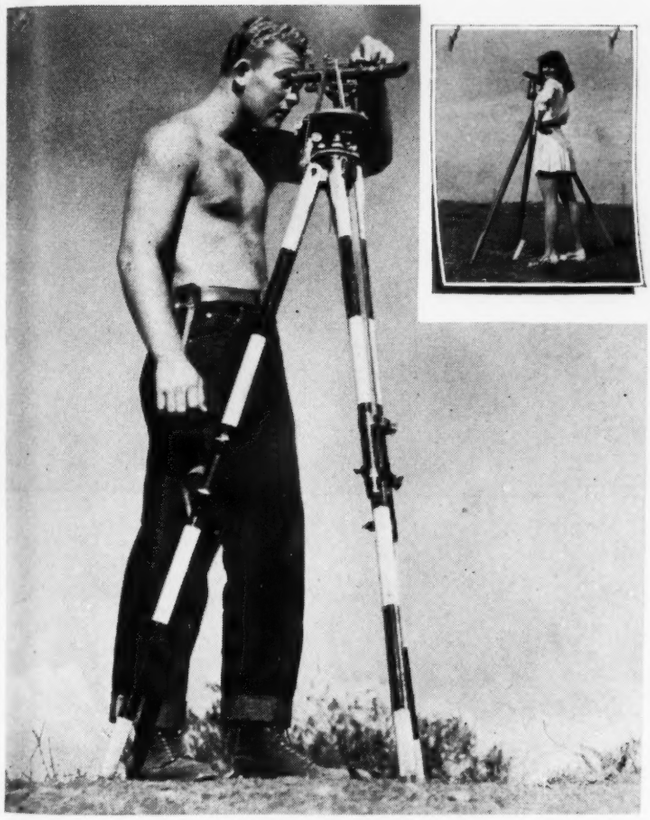
The trench was excavated to an average depth of 4 ft. and averaged 28 in. in width. Approximately 1 mi. of solid rock had to be excavated for the 18-in. line near Somis. This section was drilled and shot and the broken rock was removed by a trench hoe. The section along the ocean front was dug with ditching ma-

(Continued on page 168)

RIGHT-OF-WAY 30 ft. wide is cleared and graded to facilitate construction of pipeline. Access roads are needed in isolated regions.



JOB oddities

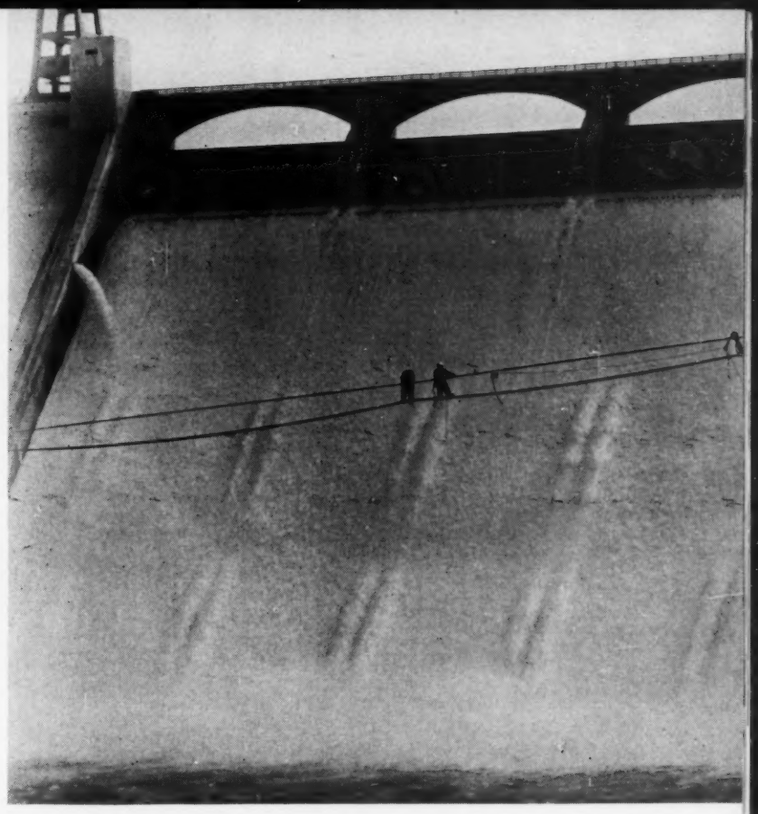


PIN-UP BOY MEETS PIN-UP GIRL. Masculine counterpart of Miss Frances Lindsey (insert), Junior Aide, Alabama State Highway Department (nominated as Road Builders' Pin-Up Girl in "Construction Methods" for July, 1944), is this member of engineering staff of San Diego Gas & Electric Co.



WASHING MACHINE is built by Seabees on Iwo Jima from empty oil drum with windmill attachment. WPB's restrictions do not inhibit men of Navy's Construction Battalions.

Wide World Photo



LIKE CIRCUS AERIALISTS, two Bureau of Reclamation riggers, suspended 100 ft. above Washington's Columbia River, install new cableway at Grand Coulee dam. It will be used to transport equipment for special caisson to be constructed on east bank of river and then floated into place below dam for spillway inspection and repair work. Workers stand on 3-in. cable which is 2,325 ft. long.



BROUGHT BY BARGE from bay on New Guinea, Buckeye trenching machine is hauled on to beach by U.S. Army Engineers using winch on 4-ton truck. It will be used on airstrip drainage.

Signal Corps Photo

BEACH MINES are exploded by 200-psi. pressure water jet (below) devised by British Army. Sea water is pumped at rate of 2,000 gal. per min. by monitors on wheeled carriages fitted with armored cabs. Operators use periscopes to direct jet at minefield from range of 20 or 30 yd.

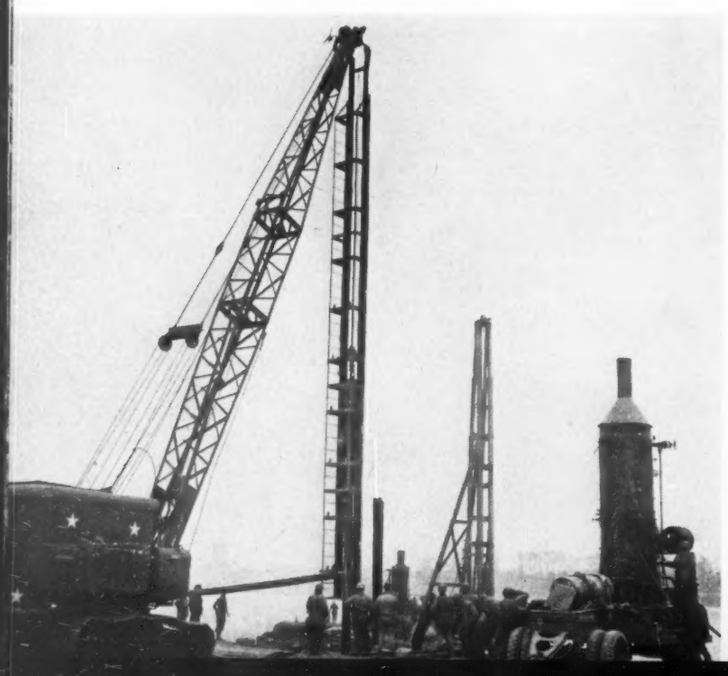
British Combine Photo





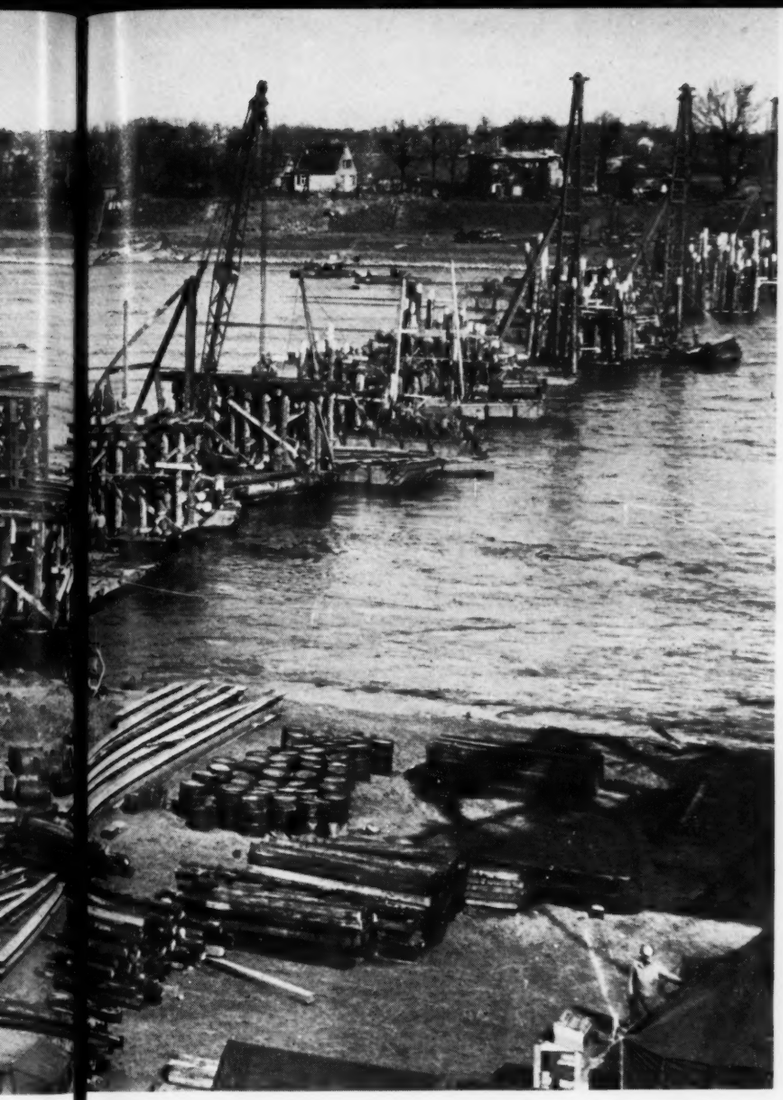
FOR RIVER SPANS of Rhine railroad bridge timber piles forming substructure are driven by floating rigs supported on barges of Seabee steel pontoon units. Near river's bank in foreground light steel trestle towers have been seated on piles to carry steel girders of 75-ft. spans. In left foreground are several of the 75-ft. long steel I-beams or "meter beams" ready to be picked up and placed to carry railroad track on bridge.

FOR LAND PILEDRIVER (below) boiler on trailer supplies steam to hammer in leads hung from boom of 20-ton Lorain crawler crane.



Railroad Bridge A

Built by Army Engineers At Wesel in 10¼ Days... Piles Driven to Carry Steel Trestle Towers Supporting 75-Ft. Steel I-Beams



Signal Corps Photos



WRECKAGE OF GERMAN BRIDGE across Rhine at Wesel forms background for piledriving operations by U. S. Engineers to provide substructure for new railroad crossing.



SEABEE PONTOON UNITS of 5x5x7-ft. welded steel construction are formed into barges to support floating piledriving and steel-erecting equipment. Each barge consists of four strings of twelve pontoon units.

ge Across Rhine

FOLLOWING THE BLASTING of German rear positions on the east bank of the River Rhine by 3,000 Allied bombers on March 22 and the destruction of the enemy's river defenses by intensive artillery fire from 1,200 guns on March 23, U. S. Army Engineers on March 24 crossed the final major barrier on the road to Berlin in the first wave of assault boats and on March 29 began the task of building at Wesel, 55 mi. north of Cologne, a heavy-duty, single-track railroad bridge across the river, completing the long pile-supported steel girder structure in 10¼ days. The bridge was built in the area occupied by the American Ninth Army with the aid of floating piledrivers, crawler cranes, trucks, tractors and other heavy eqiupment. Prior to the construction of the fixed railroad bridge, the Engineers had spanned the Rhine by floating bridges over which troops and equipment were transported to establish

PILEDRIVING (below) for shore end of bridge is done with steam hammers in leads hung from booms of crawler cranes.



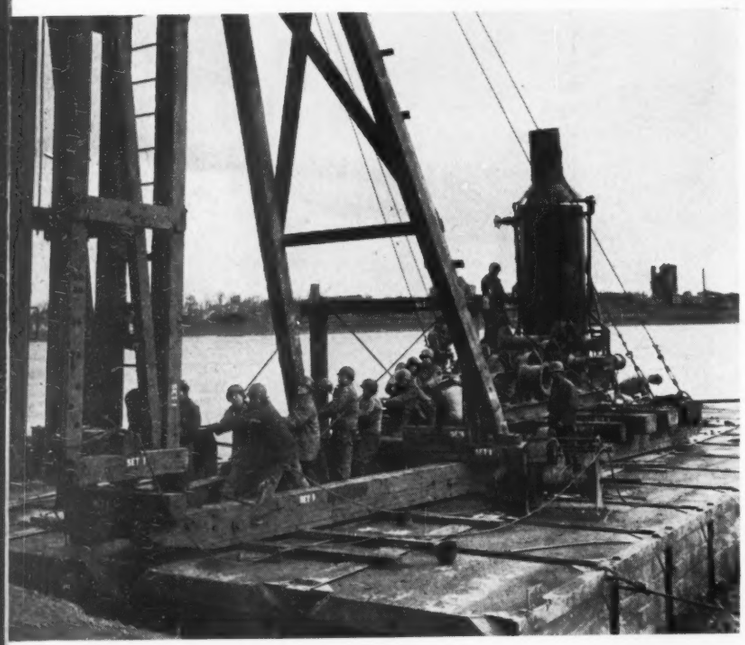


STRING OF TWELVE PONTOON UNITS, connected on shore, is pushed into river by Caterpillar D-8 tractor. Four of these 12-unit strings are then assembled to form barge to carry floating piledrivers.

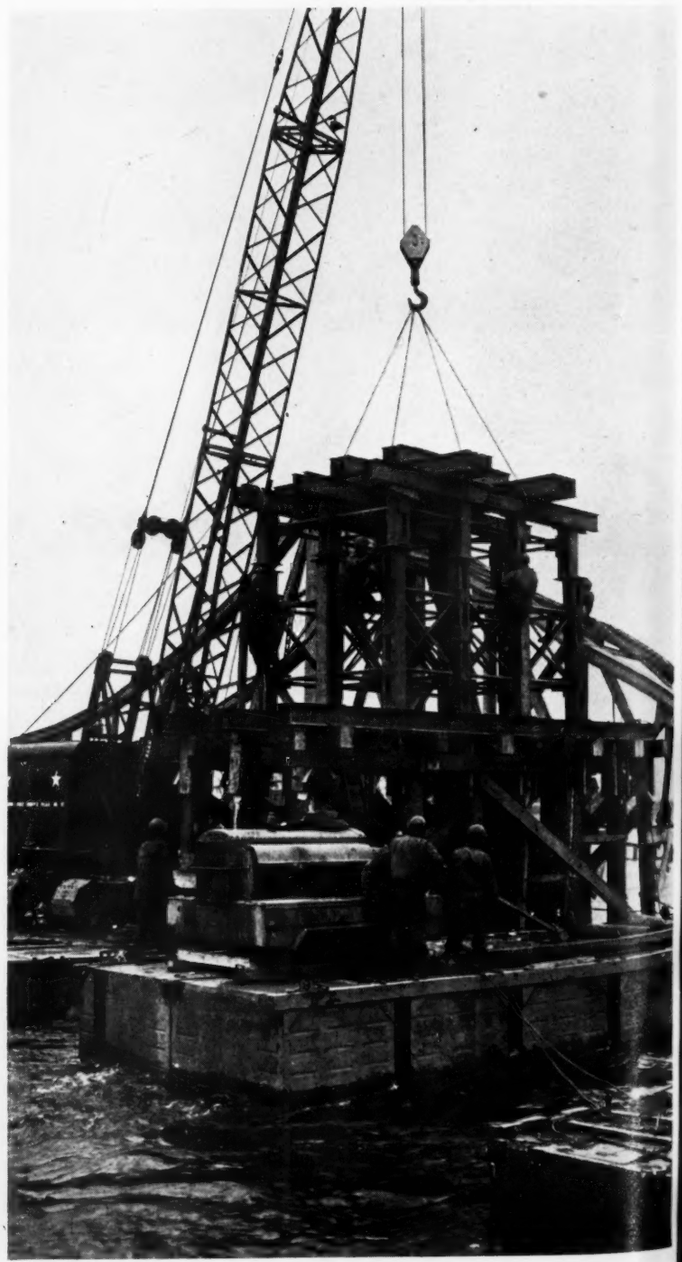
a beachhead on the east bank of the stream.

As finally built at a site upstream from Wesel the crossing comprised a 1,732-ft. length across the Rhine, a 463-ft. length across a canal on the east bank and an intervening fill 373 ft. long. The structure, involving 28 spans of 75 ft. and one navigation channel span of 92 ft., was supported on timber pile foundations capped above water level to carry preassembled, light steel trestle towers. The bridge deck was carried by "meter beams," a large supply of which had been obtained from a steel mill in Luxemburg; these are heavy steel I-beams with a depth of 1 meter (39.4 in.) and lengths of 75 to 95 ft. Two of these beams were placed under each rail except at the 92-ft. channel span, where each rail was carried by three beams.

Timber piles to support the shore ends of the bridge were driven by steam ham-



SKID-MOUNTED PILEDRIVER for river piers is carried on barge made up of Seabee welded steel pontoon units. Engineer crew is pulling lead guide into place.



LIGHT STEEL TRESTLE TOWER, prefabricated on shore, is seated on pile support by crawler crane on steel pontoon barge.

LONG SECTIONS OF RAILROAD TRACK (below), with rails spiked to wood ties, are delivered by truck-trailer for installation on bridge.





FINAL SURVEY of west bank of Rhine is made by U. S. Army Engineers preparatory to building railroad bridge alongside wreckage of German structure at Wesel.



STEEL MAT RUNWAY is laid by U. S. Engineers to provide access for trucks to material assembly area. In background, German civilian laborers taper and dress 60-ft. timber piles preparatory to driving.

mers working in leads hung from the booms of 20-ton crawler cranes. The river piles were driven by floating rigs consisting of skid-mounted drivers carried on barges made up of assemblies of Navy Seabee standard 5x5x7-ft. steel pontoon units. To expedite the work, piledriving operations were carried on simultaneously at fifteen locations along the bridge and insofar as possible various elements of the bridge were prefabricated on shore. For example, lengths of railroad track, spiked to wood ties as shown in one of the illustrations, were prepared on shore and delivered in stacks by truck-trailers, ready for installation atop the bridge girders.

The light steel trestle units forming the towers supporting the bridge superstructure were likewise shop-fabricated on shore. They were delivered to the site, picked up as complete units by floating cranes and seated on their pile supports. The accompanying official photographs by the Army Signal Corps illustrate various details of method and equipment employed to complete the bridge.

SUPERSTRUCTURE OF RAILROAD BRIDGE (below) across Rhine at Wesel is in place. Deck is carried by heavy I-beams of 75-ft. span, with ends resting on steel trestle piers atop timber pile foundations. In background is wreckage of demolished German bridge. British Combine Photo



HOW They Did It

CONSTRUCTION DETAILS For Superintendents and Foremen



SHIP-TO-SHORE RAMPS are built by Seabees in bulldozers in few hours to expedite landings from LST's at Leyte Island. Signal Corps Photo

BULLDOZER SHIFTS TRACKS (below) as U. S. Army Engineers make sidings out of captured German rails at Engineer depot in Belgium. Signal Corps Photo

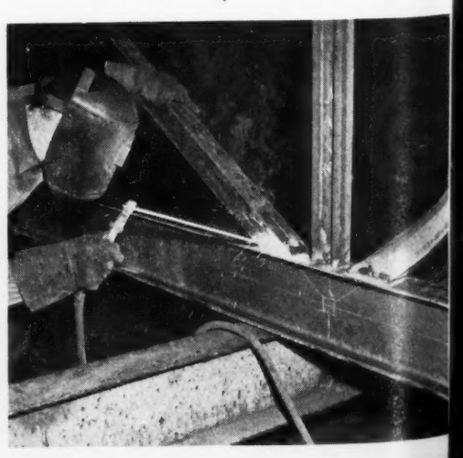


CAST IRON PIPE of 16-in. dia. is unloaded with tractor equipment ordinarily used to handle earth. Bucket has been removed from tractor and replaced with two wire cables which may be hooked around pipe or into ends of pipe. Photo from Cast Iron Pipe News





NEW DESIGN (below, right) of welded truss by The Austin Co., Cleveland, utilizes for first time H-sections with their webs in vertical plane, eliminating need for gusset plates, according to J. K. Gannett, vice-president and director of engineering. Fabricated for various lengths of 50, 60, 70, and 80 ft., truss of any length may be readily adapted to different loadings by simply changing weights of H-sections used, without changing depths of individual members, thus making it possible to use same shop details and fabricating jigs. Shop fabrication on 50-ft. truss requires total of 41 lin. ft. of fillet weld, all of it placed by down welding. H-sections are assembled in jigs and tack-welded and welding is completed with truss in vertical position. New trusses are stiffer than older designs and are easier to erect, as confirmed by ironworkers raising 50-ft. units into place in 100,000-sq. ft. addition to diesel engine plant (left).





TO SPEED RE-USE OF MOLD for making precast concrete joists, fresh concrete unit is removed soon after casting by means of vacuum beam consisting of vacuum mat reinforced with strongback for lifting. Lowered on top of precast joist, vacuum beam both grabs concrete unit for raising and stiffens it for safe handling to curing pallet. As insurance against mechanical trouble, two vacuum pumps, each one capable of performing job, are connected to vacuum tank which serves lifting beam, according to K. P. Billner, president, Vacuum Concrete, Inc., Philadelphia.



OPERATING IN TANDEM, two trucks and semi-trailer haul 25-ton diesel locomotive from powerhouse shops downstream from Grand Coulee Dam in eastern Washington to switchyards above dam. Lead truck, 9½-yd. Mack diesel equipped with Cummins motor, is loaded with 10 tons of clay to increase traction. Truck with semi-trailer is International. Diesel locomotive, powered with V-8 Caterpillar motor, operates on 30 mi. of government-owned railroad between dam and Odair, Wash.

U. S. Bureau of Reclamation Photo



WOODEN SLATS are wired in place around pipe for submarine crossing to prevent damage to protective coatings before tractors drag it into trench dredged out of bottom of Clear Lake, La., for pipeline of Tennessee Gas & Transmission Co.

Wide World Photo

SPLIT LOADER (below) mounted under weighing hopper of aggregate bin by Colonial Sand & Stone Co. at plant set up to serve A. I. Savin Construction Co., paving contractor for three runways on New York municipal airport at Idlewild, discharges sand and crushed rock to two sides of compartment in batch truck, leaving central depression in which cement can be deposited and transported with minimum danger loss. Divided discharge spouts are suggestion of John W. Davis, chief concrete technician for Jay Downer, consulting engineer, and Wharton Green, Associate. (Construction is described in March issue.)

FLAMEPROOFED WOOD (below) is used in construction of new Mercy hospital addition at Rockville Center, L. I. Masonry and tile were used up to ceiling level; above that are joists, rafters, braces, and furring strips of Minalith-flameproofed wood. Treated by American Lumber & Treating Co., wood will char but not burn.



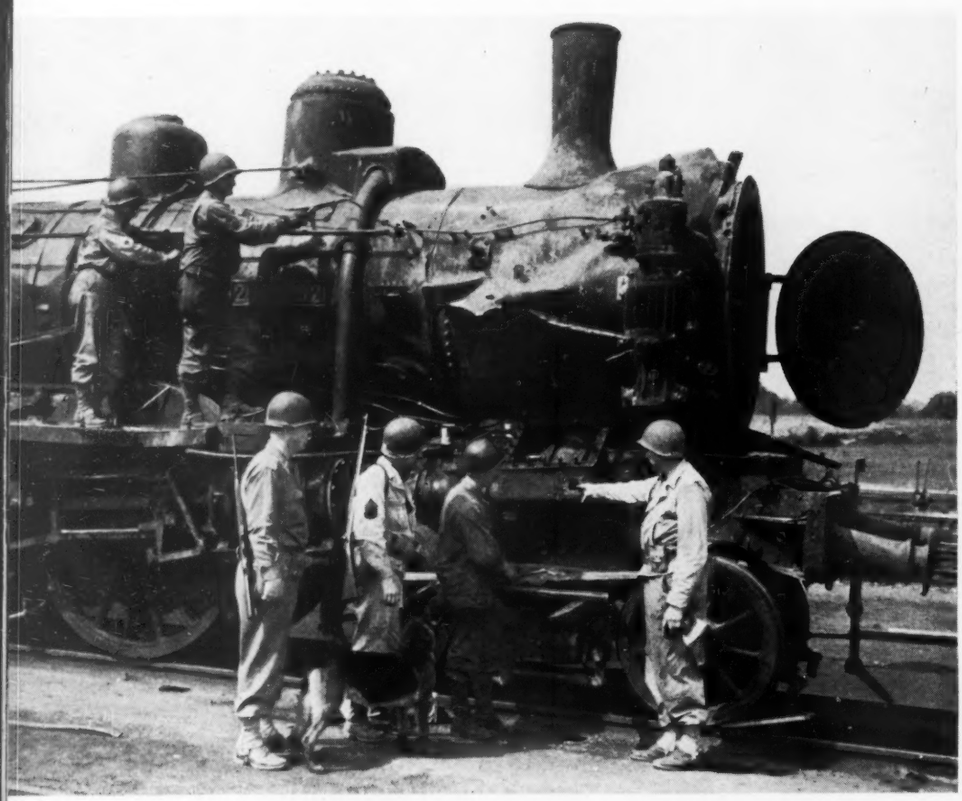


War-Damaged Railroads RECONSTRUCTED IN

By LIEUT. COL. ROBERT A. RADFORD
Chief, Railroad Section, Construction Division,
Office of the Chief Engineer,
European Theater of Operations

RAILROAD CONSTRUCTION, rehabilitation and repair is an important function of the U.S. Army Corps of Engineers. A certain number of Engineer General Service Regiments have been assigned and specially trained for this work, which includes both track and bridge construction.

The Army determines long in advance the direction of its operation, the rate of advance and the troops involved, thereby setting the supply tonnage that will be required by railroad. Eventually the problem reaches the Engineers for determination of personnel and materials required. After selection is made of the railroads which, if in operating condition, will supply the required tonnage to the proper location, an estimate must be



LOCOMOTIVE REPAIRMEN recondition French locomotive damaged by Allied air operations before being abandoned by Nazis.



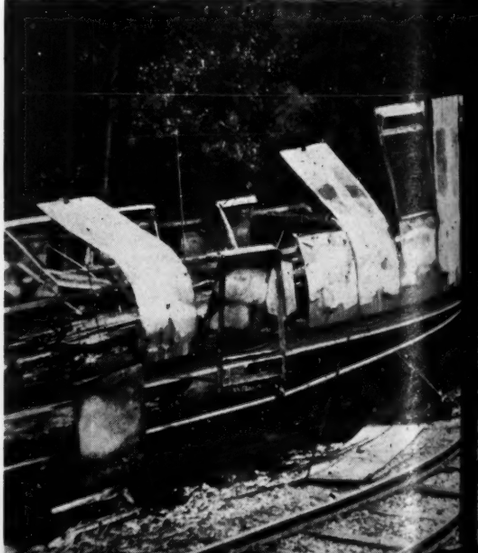
LOADED with burned-out German vehicles, these German railroad cars are isolated at Bazancourt,

Signal Corps Photos

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SWITCH REPAIR (below) and track reconditioning is carried on by Army Engineers at advanced switch-yard in France, which is needed for military supply.





made of the probable percentage of damage to track and structures that will be occasioned, first by our bombs and second by enemy demolition. The total percentage of necessary repair will determine both the material requirements and the construction troops that will be required. For an action like the landing in France, this must all be done months beforehand.

The number of individual items required to build or rehabilitate a railroad run into the hundreds. Some of these items take months to fabricate. Items such as standard bridging of various types may first have to be designed. Standards must be set for rails, water tanks, ties, frogs and all the innumerable items of both facilities and material which will enter into rehabilitation work. After individual items have been estimated, there comes procurement, transportation and stocking at a point where such material will be most readily available.

Enemy Demolition—Demolition by the enemy is a variable factor. Where an

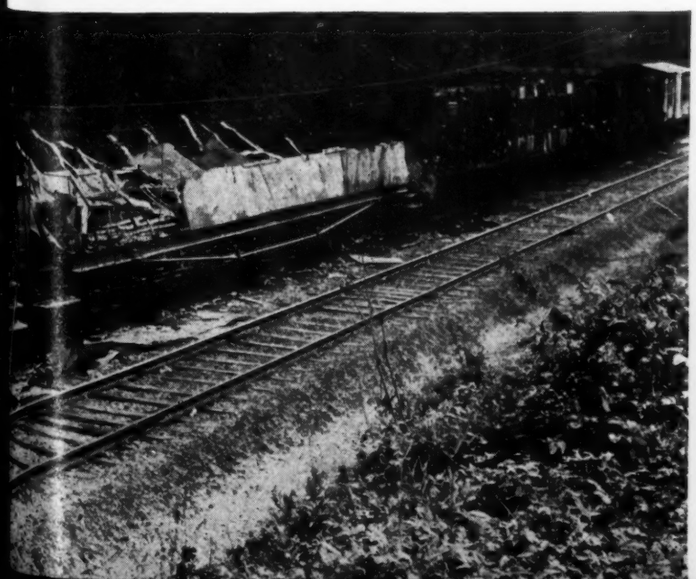


France. They were stopped en route to rear when American bombing severed tracks.



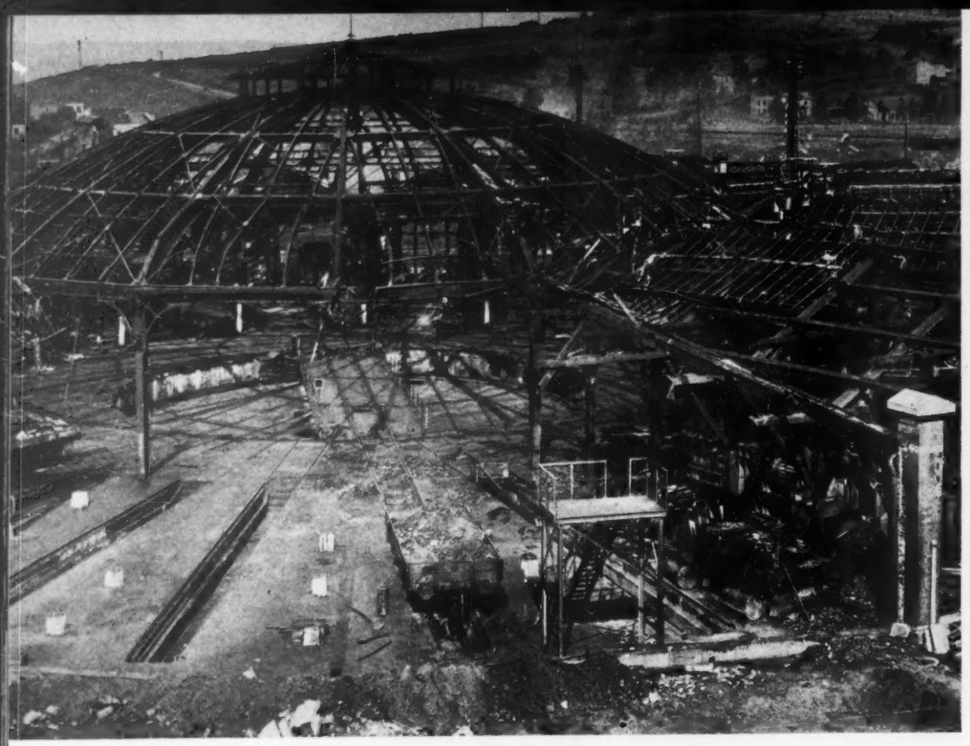
DEVASTATED BY BOMBS, these railroad marshalling yards at Limburg, Germany, are now in Allied hands. All tracks and ties have been ripped up.

CHARRED WRECKAGE (below) is all that remains of German supply train blasted by American tanks in France. Train carried tanks, ammunition, supplies and troops.

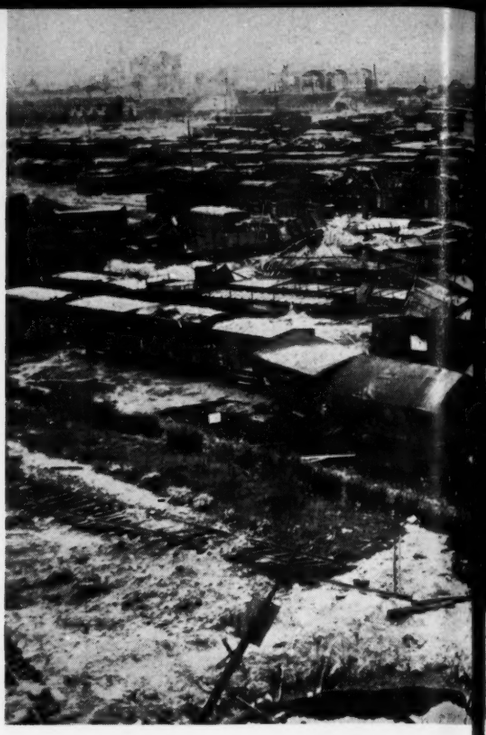


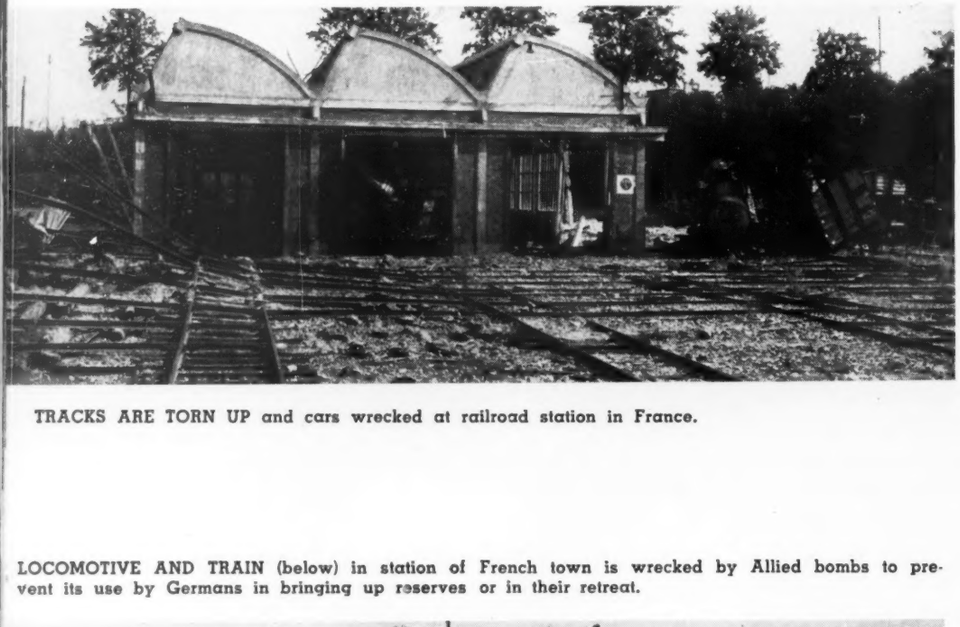
OXYACETYLENE TORCH (below) is used to trim rail to fit, one of first steps in putting roadbed of yards in Germany into condition for supplying front-line troops.





ROUNDHOUSE at rail yards in Mohon, France, is wrecked by U. S. bombing.





TRACKS ARE TORN UP and cars wrecked at railroad station in France.

LOCOMOTIVE AND TRAIN (below) in station of French town is wrecked by Allied bombs to prevent its use by Germans in bringing up reserves or in their retreat.



advance is very rapid, as in France, the percentage of demolition decreases, but the amount of track that must be rehabilitated in the same time increases. In a slow advance just the opposite is found. Material requirements tend, therefore, somewhat to equalize. Planning for bridge replacements is for from 25 to 75 percent for the larger bridges. This means any bridge with a span more than 50 ft. but does not necessarily mean that all spans of a ten-span bridge will be destroyed.

On track work, the major destruction will be of frogs and switches, unless a rooter is employed. This instrument will damage every rail and break every tie over a considerable length of track, if given time. Our own destruction by bombs is confined largely to railroad yards and major bridges.

In all of France 4,600 railroad bridges were destroyed in 1944. There were in France prior to the war and exclusive of electric locomotives, 16,000 engines and 500,000 cars. There can be found in France now 140,000 cars and 11,000 locomotives, of which 5,500 can be operated. The condition of the other 5,500 varies from those which can be repaired to many that are fit only for scrap. It is estimated that it will take 10 yr. to place the French railroads back in condition equal to that before the war. It is also estimated that it will cost 5,000,000,000 francs, or $100,000,000 at the present exchange rate, to repair the railroad bridges of the Western District—that is in Normandy and Brittany.

The U.S. Army Engineers have repaired only tracks which were needed for military supply, selecting for supply routes, where possible, those lines that were least damaged. All tracks, bridges and facilities not directly required for



MASS OF TWISTED WRECKAGE is all that is left of these railroad yards in France after Allied bombings.



FRENCH RAILROAD YARDS are seriously damaged by Allied aerial attacks and must be repaired.

military purposes are being left to the French for rehabilitation.

At one place in France a 100-ft. mobile railway artillery carriage was used to span two 50-ft. consecutive spans. This was launched across the openings, the trucks removed, and lowered into place. It made a very successful bridge and is a sample of the ingenuity required in war construction and exercised by some of our commanders drawing on their past construction experience. At another location near Metz, a group of Engineers needing materials unavailable at the moment stepped over into enemy territory for certain girders which they picked up with a mobile crane and returned safely to their own lines.

Following closely behind the troops, Engineers have restored to date about 6,950 mi. of railroads in France, Belgium,

(Continued on page 164)



RAILROAD WORKSHOP at Mantes, France, is damaged by American Air Corps bombers, completely disrupting work.

GERMAN RAIL TRUCK (below), salvaged by Engineers, is used to push freight cars on French railroad.



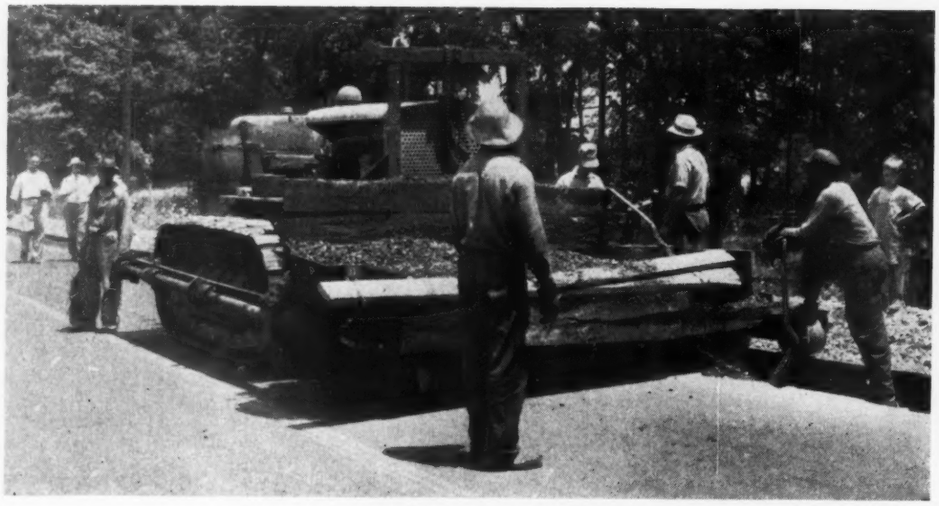
GAS WELDING EQUIPMENT (below) is wheeled to job by means of carrier improvised from half of standard dolly set.



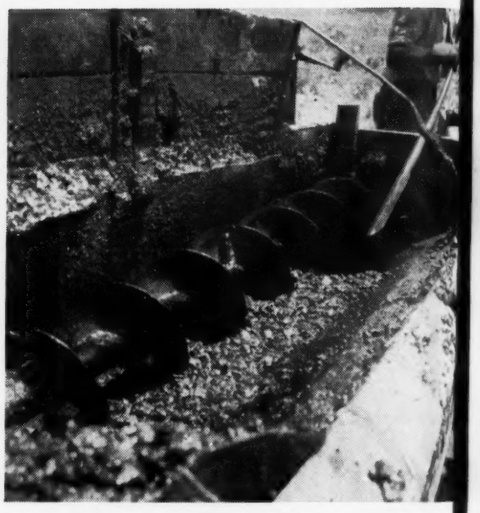
Tractor-Mounted Spreader Places Bituminous Widening Strip



FIRST STEP IN WIDENING 18-ft. Indiana Highway is to cut trench alongside existing waterbound macadam pavement wide enough to accommodate outside forms. Here forms are in place and subgrade has been rolled, ready to receive material for added pavement width.



MATERIAL SPREADER riding in front of D7 Caterpillar tractor places bituminous mix in trench for widening pavements. Longitudinal screw feed, powered by tractor takeoff, carries mix to discharge chute over trench.



10-FT. CONVEYOR in spreader box has 12-in. screw mounted on 2-in. shaft. Hopper 11 ft. long by 3½ ft. wide is made up of 2x8-in. lumber.

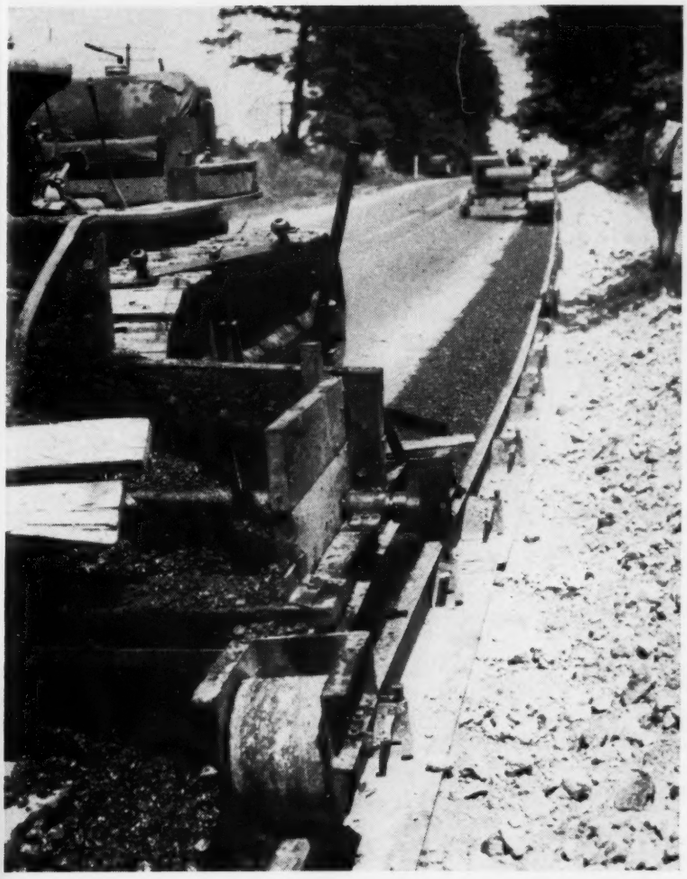


CHAIN DRIVE from takeoff jack shaft at rear of tractor delivers power to screw conveyor in spreader box through shaft mounted on crawler frame. Opposite end of shaft engages converted truck transmission, which drives screw feed.

ON INDIANA'S HIGHWAY MAINTENANCE PROGRAM, keeping wartime traffic-battered roads serviced for the duration, one contractor has added widening strips to narrow bituminous roads with an ingenious hand-made tractor-mounted spreader box. Accompanying photographs show an operation on which the equipment was used in widening 7 mi. of an old 18-ft. waterbound macadam section of State Highway 62 to 22½ ft. A $130,000 contract, awarded to Middle West Roads Co., Noblesville, Ind., included overall resurfacing with bituminous binder and rock asphalt wearing courses.

Bituminous Concrete Widening—Strips 27 in. wide and 6 in. deep were placed flush with, and on each side of, existing pavement. Material in the widening strips was hot-mixed hot-laid asphaltic concrete, consisting of 60 percent aggregate passing a 1-in. screen, 35 percent sand and 5 percent bitumen. The strips were laid in two 3-in. well-compacted layers on previously prepared subgrade.

In preparation for the widening, a 6x36-in. trench was excavated along each side of the old pavement. To speed the trenching and produce a uniform subgrade, a motor patrol grader was used with a scarifier ahead of a special grader blade to loosen the shoulders before the earth was plowed out. Steel road paving forms, 9x8-in., were set to line and grade along the outside of the trench. Edges of existing pavement were scraped clean of all earth and loose material and then



SCREW CONVEYOR discharges mix through chute at trench end of long spreader box. Chute is equipped with sliding gate, operated by hand lever at rear of box, which controls depth of spread and strikes off surface. Steel wheels rolling on form support overhanging end of spreader box.



HOT MIX IS DELIVERED to spreader by 6-ton dump trucks which back up to spreader and are pushed ahead by tractor as trucks unload. Here outfit is placing top layer of two-course widening strip, flush with top of old pavement.



FINAL COMPACTION of finished strip is by Galion three-wheel trench roller. This roller compacts subgrade as well as both layers of bituminous mix.

were sprayed with a coat of hot emulsified asphalt for binding the new mix.

Tractor Spreader—Material for the widening was placed in two 3-in. layers, top course flush with the existing pavement, by means of a spreader box suspended from the front of a Caterpillar D7 tractor. This box, built by the contractor from 2x8-in. rough oak planks and lined with light steel sheeting, is 11½ ft. long and 39 in. wide.

The spreader, which discharges the material into the trench at one end, is equipped with a screw conveyor, driven by the tractor power takeoff. At the rear of the tractor a chain, driven by a sprocket on the power takeoff shaft, drives a shaft mounted on the outside of the right crawler frame. At the front end of the tractor, this shaft, in turn, drives the 10-ft. screw conveyor in the spreader box through a converted truck transmission. The spreader hangs from an angle-iron frame mounted around the tractor radiator. Part of the weight of the box and contents is carried on two 11-in. steel front wheels, 8-in. wide, one riding the old pavement and one running on top of the form. A third stabilizing wheel also rides the form.

At the end of the box overhanging the

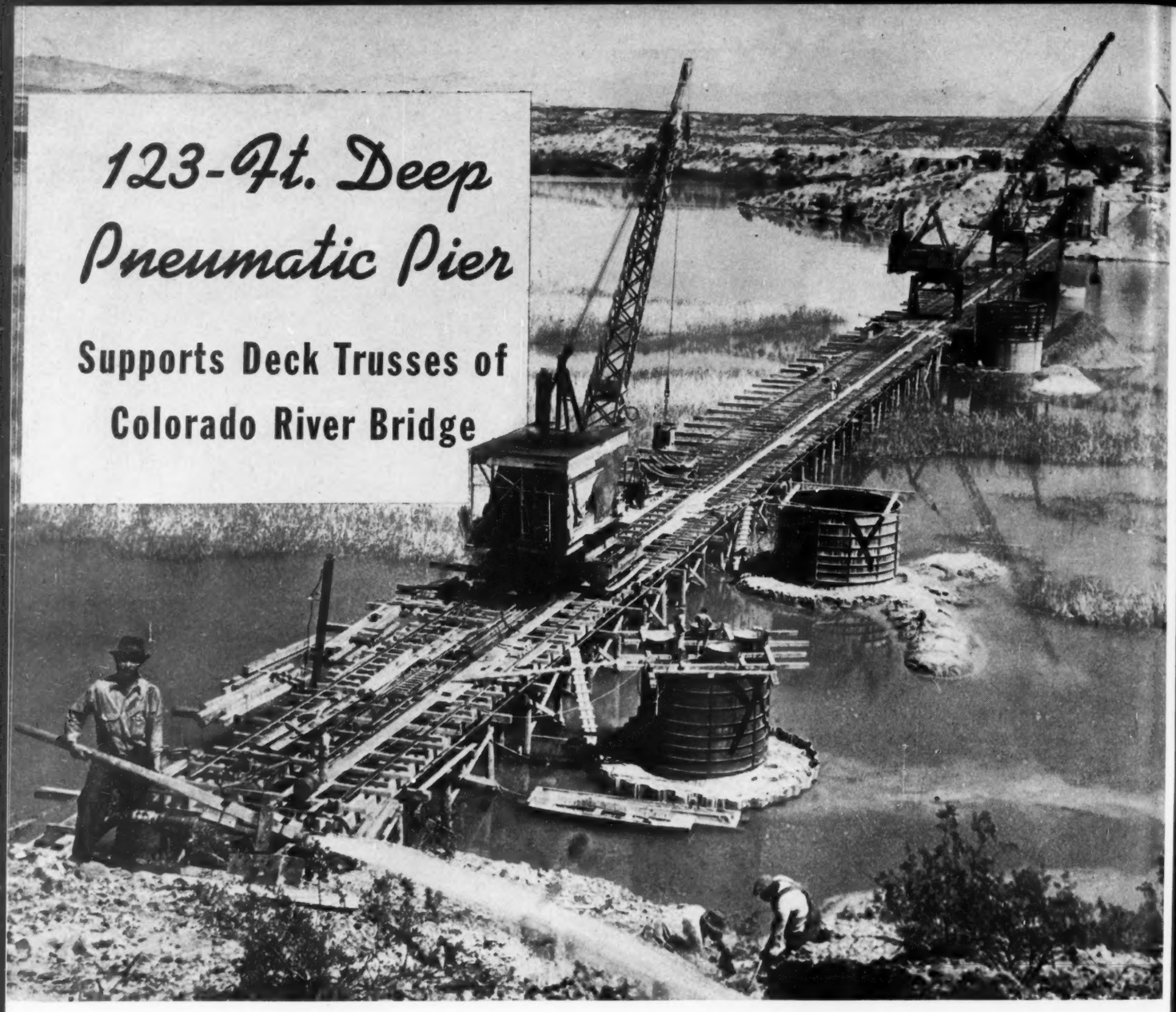
(Continued on page 168)



SUB-DISTRICT SUPERINTENDENT of maintenance is HUGH FREDERICKS, seen here beside contractor's trench spreader box.

123-Ft. Deep Pneumatic Pier

Supports Deck Trusses of Colorado River Bridge

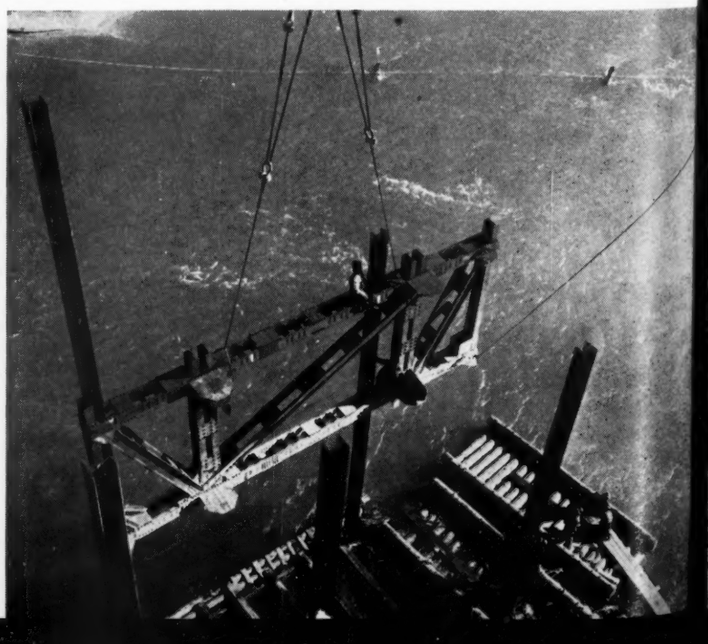


PILE TRESTLE supports full-revolving cranes used for pier construction. Concrete mixed on Arizona side, in distance, is hauled across trestle by dinkey locomotive and placed by crane. In foreground is sheetpile cofferdam and metal form for shaft of pier, with crane handling concrete bucket for this shaft.

STEEL SHEETPILE COFFERDAM (below) protects concrete cylinders of east pier, as pumps keep down water level while concrete is placed around bell above cutting shoe of north caisson, at right.



STIFFENER FRAME (below) is lowered to serve as template at start of driving H-section bearing piles of steel bent for erection of deck trusses. American Bridge Co. erected steel.



THE DEEPEST PNEUMATIC PIER ever constructed in the United States was sunk for the recently completed Santa Fe Railway bridge over the Colorado River at Topock, Ariz. The 1,507-ft. deck truss and girder bridge replaces a light cantilever structure which, when built in 1890, was the largest cantilever bridge in the country.

The deepest pier extends 123 ft. below water level and is located about 500 ft. off the Arizona bank. All of the main piers are composed of twin 24-ft. concrete cylinders tied together for the upper 10 ft. with 4-ft. reinforced concrete apron walls, extending 5 ft. above and 5 ft. below water surface. Solid foundation material was found 18 ft. lower on one side of the 123-ft. cylinder than on the other. Since each cylinder was imbedded at least 2 ft. into solid material, rock excavation was required for 20 ft. on one side of the caisson to secure the minimum penetration on the other.

Special permission was obtained from the Arizona Industrial Accident Commission to allow use of air pressure of 52 psi., 2 lb. above the state limit. Men working inside the caisson descended through an air lock in which the transition to 52-lb. pressure was made. Under this high pressure sandhogs were permitted to work 30-min. shifts.



CURRENT NOSES and seats for apron walls are p'aced on completed caisson shafts. Airlock in foreground serves sandhogs. In extreme background is form for east abutment of bridge.

Wood Pile Construction Trestle

Excavation, concrete placing and other operations were carried on from a wood pile trestle built completely across the river immediately upstream from the position of the completed structure. Concrete was batched and mixed at a plant on the Arizona side and transported over the construction trestle by a dinkey locomotive. Gantry cranes were mounted on the trestle for handling steel, concrete and excavated material in the pier work.

Work on the substructure was begun on Nov. 16, 1942, and completed on July 1, 1944, by the Kansas City Bridge Co. The American Bridge Co., contractor for the superstructure, began work on May 1, 1944, and the bridge was placed in regular use on March 7, 1945.

The superstructure consists of three 350-ft. deck truss spans over the channel, a 50-ft. beam span and a 100-ft. deck girder span on the east end, and three 100-ft. deck girder spans on the west end. Construction of the bridge required 14,077 cu. yd. of foundation excavation, 17,878 cu. yd. of concrete in the substructure, 6,506 net tons of bridge steel, and 106,808 field rivets. Both abutments and the seven piers are supported on reinforced-concrete cylinders carried down through silt and unstable material to solid rock. Center-to-center spacing of cylinders in the abutments and piers varies from 24 to 38 ft.

Cylinder Design

The cylinders in the east abutment and the first pier were sunk by open excavation to final position. Cylinders of all other piers and the west abutment were sunk by open excavation and the pneu-

TEMPORARY STEEL BENT (below) supports 350-ft. deck truss span at mid-point during steel erection. Traveler crane is erecting lower chord member of one truss.



DECK TRUSSES (below) of final 350-ft. span are landed on east pier. In erecting each of these spans, traveler works forward on erected steel, which is cantilevered for half of span, and then places steel piles. Other half span is contilevered from false bent.



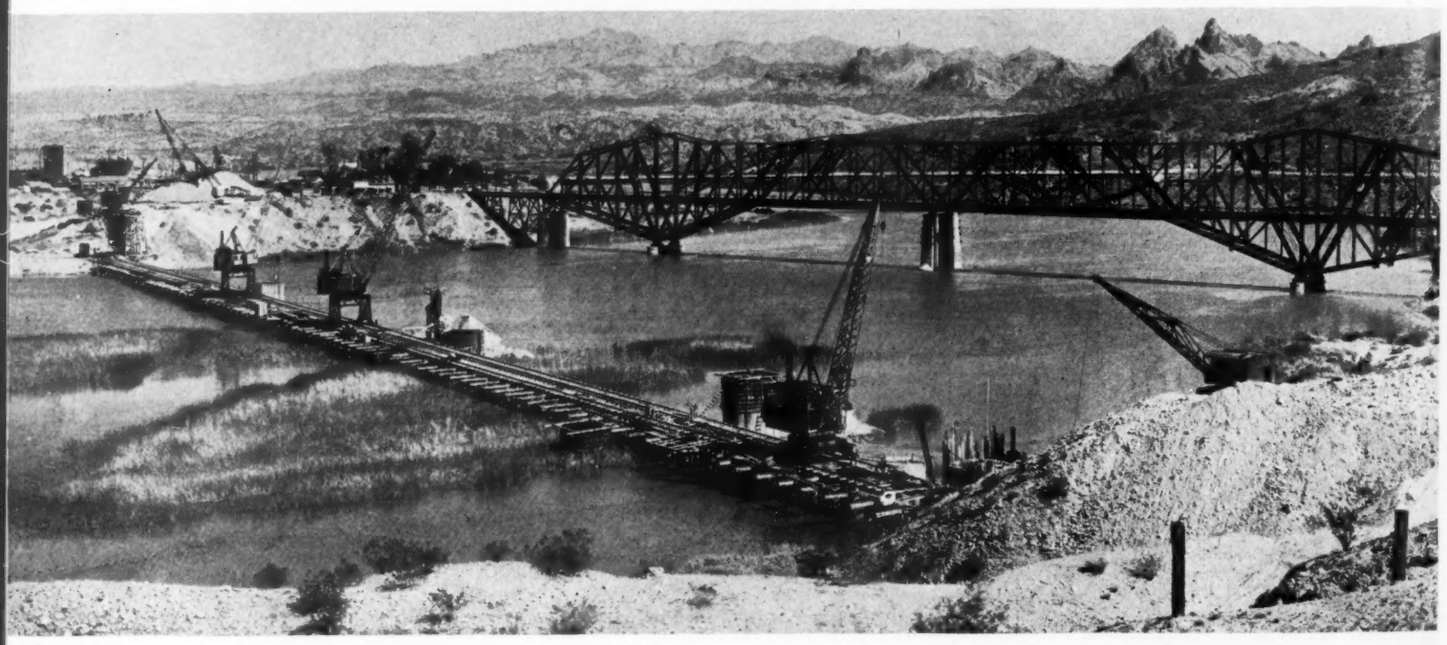


GAP IS CLOSED with placement of four 100-ft. plate girders in span at Arizona end. Right end of girder rests on abutment and left end is supported by steel tower erected on pier.

matic process. The design of cylinders consists of reinforced concrete walls with an 8-ft.-dia. well in the center, belled out to form a working chamber at the bottom, provided with a steel cutting edge. Cylinders were embedded 2 ft. into solid rock at the lowest elevation of the rock, after which the working chamber and the 8-ft.-dia. well were filled with concrete.

Higher Grade Line

The grade line across the new bridge is higher than on the old structure. Grading of the west approach line change was by Sharp & Fellows Contracting Co., of Los Angeles, and of the east approach by A. S. Vinnell Co., of Alhambra, Calif. Incidental structures were erected by Morrison-Knudsen Co., Inc., of Boise, Idaho. The bridge was constructed under the direction of G. W. Harris, chief engineer of the Atchison, Topeka & Santa Fe Railway System, and M. C. Blanchard, chief engineer of the railway's Coast Lines. Walter E. Robey was resident engineer.



ORIGINAL CANTILEVER BRIDGE, in background, strengthened in 1910 by addition of pier under center of 330-ft. suspended span and revamping of trusses into two 165-ft. spans, is 50-yr-old railroad crossing which new structure replaces. Old bridge will be converted to highway use. In foreground is trestle with cranes at work on pier for new bridge.

CRUSHED ROCK BALLAST (below) for double tracks, steel hand rail and walk are placed on deck of new bridge. In left foreground is overhead crossing from former tracks, to be removed to provide highway location.



Old Bridge Given to State

The old bridge, which proved inadequate for modern heavy traffic, has been given to the states of California and Arizona as a new crossing for automobile traffic on Highway 66. It will not only shorten the highway but will also mean acquisition of a span with no weight limit for automobiles.

LEGAL ADVENTURES of TRACTOR CONN

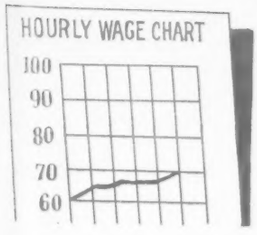


By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

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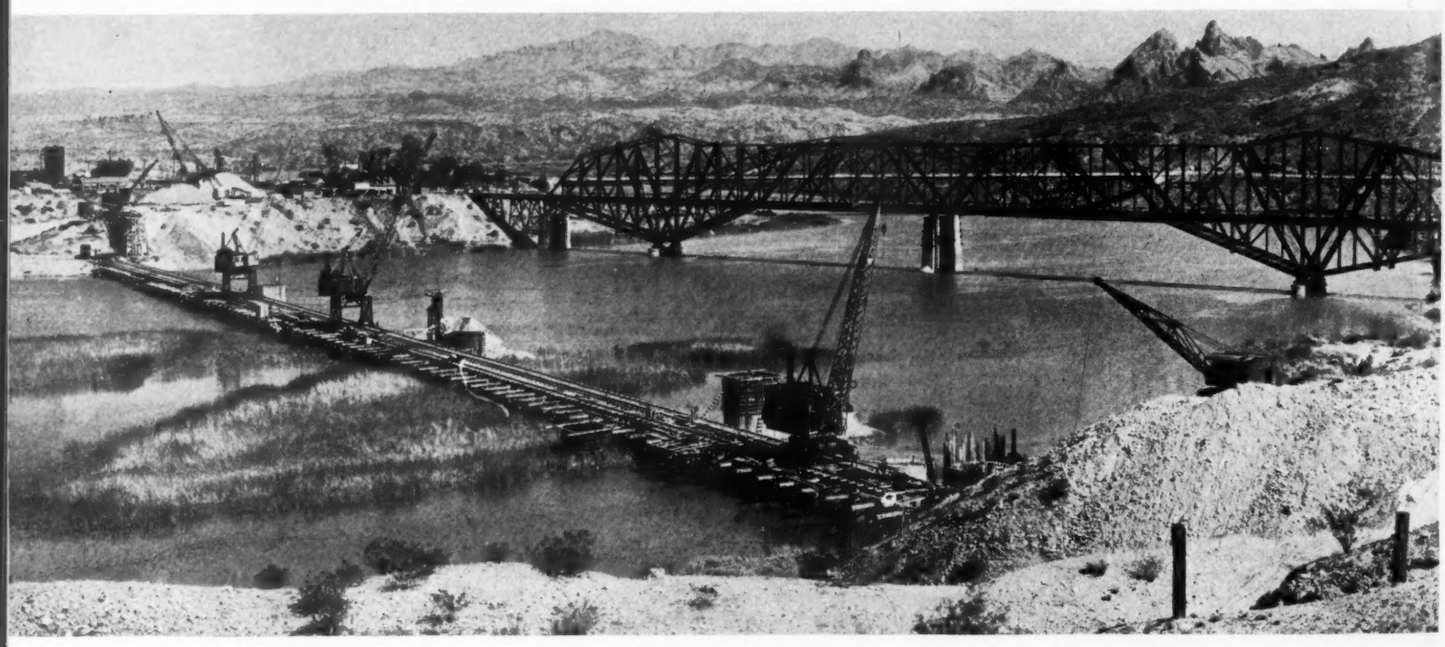


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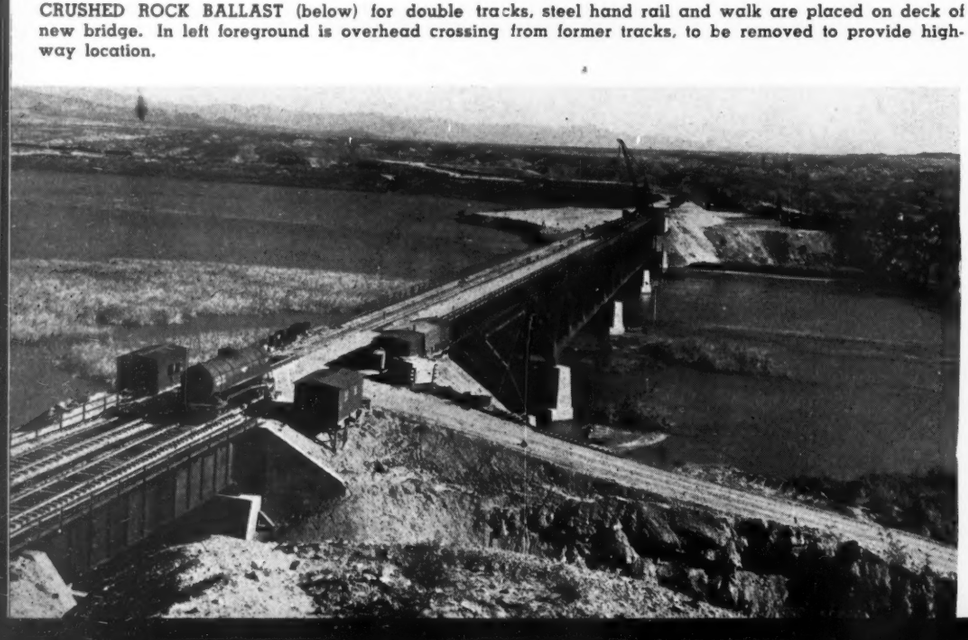
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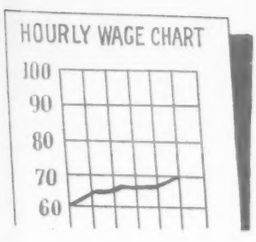


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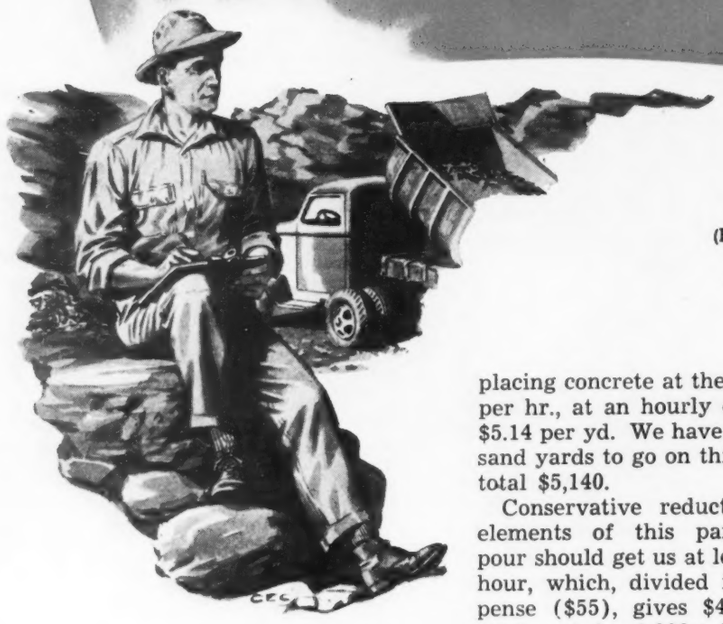
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More Legal Adventures of Tractor Conn Next Month

Time Study SUGGESTS WAYS TO SAVE $800 ON $5,000 OPERATION



By PHILIP H. KLINE

(Formerly Equipment Operations Engineer, Tennessee Valley Authority)
Wilmington, Del.

HOW A SIMPLE FIELD STUDY may help a superintendent to judge the value of making improvements to increase job production is indicated by a memorandum which a job engineer prepared suggesting possible means of saving $800 on a $5,000 operation. It was necessary to haul concrete for this operation about 1 mi., mostly up a 7 percent grade, from a central mixing plant to a dumping hopper at the edge of a bank. From the hopper, a pipe chute dropped the concrete to a crane bucket which was swung to the forms. A few moments' observation by the job engineer revealed the bottleneck in the operation, and a time study was made then and there to assist the man in charge in analyzing his costs. The engineer offered suggestions in the following memorandum.

Job Office, March 22

To: Superintendent

From: Job Engineer

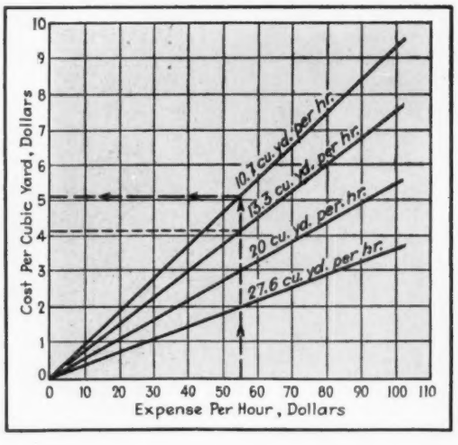
I sat on a rock this P.M. for about an hour, and took some notes on the concrete placing operations in Area "S." These notes are summarized for you below. None of the observations is new to you; you have no doubt given them plenty of thought. This report merely translates for you the actual operations into terms of dollars, for your consideration.

The crux of the matter is that we are placing concrete at the rate of 10.7 cu.yd. per hr., at an hourly expense of $55, or $5.14 per yd. We have still about a thousand yards to go on this pour, which will total $5,140.

Conservative reductions in the time elements of this particularly difficult pour should get us at least 13.3 cu.yd. per hour, which, divided into the same expense ($55), gives $4.13 per yd., or a total cost for 1,000 yd. of $4,130.

From the $1,010 difference we must subtract about $200 for improvements, which should mean a net saving of at least $800 for the ten or twelve days' work. The details of these calculations are given here, should you care to go over them with me.

Costs involved in the operations are listed in an accompanying table in the order of the cycle, including placing costs at the forms, where the unit cost per yard is governed directly by the rate of concrete delivery. With a total cost per hour of $55, it is apparent that each ½ min. saved will cut down the expense by about 50 c.



COST PER CUBIC YARD comes down as rate of placement increases. Example: If expenses are $55 per hr., go up to rate of production, 10.7 cu.yd. per hr., and to left to find unit cost per yd. of $5 +. If production can be increased to 13.3 cu.yd. per hr., unit cost will be $4 + per hr.

Another table summarizes the cycle time for each part of the operation, as noted during the period of observation today. From the cycle given, the whole operation sets up like this:

	Min.	Sec.
1. Wait for mixer to start discharging	1	00
2. Loading truck at mixer	1	56
3. Haul to chute on top of hill	5	53
4. Waiting for bucket at chute	2	03
5. Dumping and getting ready to leave	2	32
6. Return downhill to mixer	5	55
Overall cycle time	19	19

Possible improvements of these various items are many. Each operation has been studied for the easiest and most obvious corrections at minimum expense. Corrections which promise to cost less than 20 percent of the individual savings they make possible are included in the list given below:

(1) The capacity of the mixer is at least 20 cu.yd. per hr. on a 3-min. dumping cycle, and production at full capacity should entail no additional expense. We should save all the delay time waiting for the mixer to discharge, but say we saved 30 sec.

(2) It might be possible to get an improved mix which would discharge faster. We could steepen the chute from the mixer to the trucks, build raking platforms, install new truck ramps, and make raking tools, all at an expense of not more than $50, and save a small portion of the loading time, say 10 sec.

(3) Some road work should definitely be done, particularly on the pipe crossing about two-thirds of the way up the hill. The trucks should make the uphill haul in not more than 5 min. Spending not more than $20, say we save one-third of the excess time, or 20 sec.

(4) The wait at the chute might be entirely eliminated. A clean-up of conditions at the chute, driver instruction to gage passing points, a larger hopper at the dumping end, and installation of another discharge arrangement should entail no expense not mentioned below. Say only part of the time is saved, or 1 min.

(5) A steeper chute, open type, may be installed. We can equip the unloading men with better tools, build raking platforms for them, improve the mix as under item 2, and have the driver help unload, if possible. Total rearrangements should not cost more than $130. The trucks should dump in 30 sec., say at most in 1 min. 32 sec., which would save 1 min.

(6) The return empty to the mixer should be not 5 min. 55 sec., but less than the uphill loaded haul, which averaged 5 min. 53 sec. With no further expense than under item 3, the savings in this time should reduce the return trip to 5

(Continued on page 154)

TIME STUDY

LOADING TRUCK

Arrive	Start Loading	Leave	Elapsed time: Wait for mixer	Elapsed time: Loading
11:48:10	11:48:45	11:50:40	00:00:35	00:01:55
11:53:40	11:55:00	11:58:00	00:01:20	00:03:00
12:00:40	12:01:00	12:04:00	00:00:20	00:03:00
etc.	etc.	etc.	etc	etc.

Average wait for mixer 1 min.
Average loading time 1 min. 56 sec.

HAULING TO CHUTE

Truck	Leave mixer	Arrive hopper	Elapsed time
No. 8	11:50:40	11:57:00	00:06:20
No. 11	11:58:00	12:03:00	00:05:00
No. 7	12:04:00	12:10:40	00:06:40
etc.	etc.	etc.	etc.

Average: Truck No. 8 5 min. 57 sec.
Truck No. 11 5 min. 30 sec.
Truck No. 7 6 min. 03 sec.
Average for all trucks 5 min. 53 sec.

DUMPING AT CHUTE

Arrive	Start dumping	Leave	Elapsed time: Wait to dump	Elapsed time: Dumping
11:57:00	11:58:00	11:59:40	00:01:00	00:01:40
12:03:00	12:03:40	12:08:30	00:00:40	00:04:50
12:10:40	12:14:40	12:16:00	00:04:40	00:01:20
etc.	etc	etc.	etc.	etc.

Average waiting time 2 min. 03 sec.
Average dumping time 2 min. 32 sec.

RETURN TO MIXER

Truck	Leave chute	Arrive mixer	Elapsed time
No. 8	11:59:40	12:05:00	00:05:20
No. 11	12:08:30	12:13:00	00:04:30
No. 7	12:16:00	12:21:00	00:05:00
	etc.	etc.	etc.

Average: Truck No. 8 5 min. 35 sec.
Truck No. 11 5 min. 05 sec.
Truck No. 7 7 min. 05 sec.
Average for all trucks 5 min. 55 sec.

ROUND-TRIP TRUCK CYCLE

Truck	Arrive at chute	Return to chute	Elapsed time
No. 8	11:37:30	11:57:00	00:19:30
No. 11	11:44:00	12:03:00	00:19:00
No. 7	11:49:00	12:10:40	00:21:40
	etc.	etc.	etc.

Average: Truck No. 8 18 min. 56 sec.
Truck No. 11 19 min. 20 sec.
Truck No. 7 20 min. 13 sec.
Average for all trucks 19 min. 26 sec.

BUCKET CYCLE

Leave chute	Return to chute	Elapsed time
12:01:30	12:03:40	00:02:10
12:13:00	12:14:40	00:01:40
12:17:40	12:19:30	00:01:50
etc.	etc.	etc.

Average bucket cycle 1 min. 26 sec.



DELIVERING CONCRETE to isolated operation, truck dumps at top of bank into hopper feeding pipe chute which discharges into concrete bucket on lower level. Crane swings bucket to forms. Extra bucket lying on side is not used.



UNIT COST of placing concrete in difficult location is governed by rate at which trucks can deliver mixed batches through pipe chute to crane bucket. Note eight idle men waiting for bucket of concrete. Two others also idle are crane operator and man who assists in spotting bucket at lower end of your chute.

RUSSIA AND AMERICA

ALLIES—or else . . .

VICTORY in Europe was won only through the combined endeavor of the United Nations. Only through sustained joint effort can the fruits of that victory be reaped.

Without disparaging the truly heroic contributions of others, three of the Allies may fairly be credited with having made the major contributions to victory over the European Axis—the United Kingdom, Russia, and the United States. The close accord of these three nations is no less crucial to the accomplishment of the tasks that remain.

First of these is the war against Japan. It still requires winning. Even without any help from others, the United States could make good this victory, but the war's duration will be speeded by the marshaled effort of the United Nations.

Next, and not less important, is the task of establishing a basis for enduring peace. In this struggle our enemies are more formidable than any we have faced—national ambitions, prejudices, suspicions and distrusts, the staggering burden of tradition and debilitating cynicism born of past failure, the cleaving wedges of divergent languages, thought patterns, economic creeds and procedures—an array of difficulties as baffling as fog and as formidable as a deluge. They can be vanquished only by a continuance of the working accord between the United States, Russia, and Britain that was forged on the anvil of European conflict.

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This high appraisal of the decisive importance of the Big Three in determining the destiny of the United Nations organization, in no way depreciates the importance of the role to be played by France, by China, or the other freedom-seeking nations represented at San Francisco. All of us are committed to the building of a genuinely representative security organization in the conviction that by such means alone can we possibly achieve a just and lasting peace. But the strength of any international machinery will depend upon the validity of Russian-British-American cooperation. If these three are able to achieve substantial harmony of aim and procedure, a world organization that includes them can operate with effective coherence. If they pull apart, the United Nations will break up into competing and jealously hostile blocs.

This is inevitable because of the sheer weight of these three nations in the world's affairs. Between them they account for perhaps half of the world's income and from two-thirds to three-quarters of its industrial output. Once Japan has been crushed, they will control an overwhelming preponderance of the world's armed might. Each of them will wield military power on a scale quite beyond the power of any embryo security league to hold in check. Only if all three are resolved to keep the peace and to enforce it through the Security Council, can that body hope to accomplish its aim.

Although there is a tendency on both sides of the Atlantic to indulge somewhat recklessly in mutual criticism, the ties between Britain and America are too firm to be severed by any foreseeable strain. But that has not been true of our relations with Russia. Even while fighting a war in which our respective ways-of-life were at stake, the inestimable services of each to the other were rendered as friendly but independent associates rather than as fully trusted partners. Now again, as we approach the difficult and vitally important task of building a world organization and of devising a European peace, the task of our delegates is complicated by national attitudes under which each hopes for the best from the other, while fearing the worst.

But the stakes for us both—and for the rest of the world—are too high to be played for in a diplomatic poker game. Russia has no inhibitions in demanding what she wants, and our own vital interests must be stated and upheld with undeviating firmness. Yet we both must face the stark fact that few advantages that either nation might gain at the cost of dissipating the good will of our wartime association could be worth the price thus paid.

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The first steps toward establishing confidence lie in a frank recognition of what may contribute to the lack of it and in a definition of what can be done to restore it.

1. *Probably the greatest single area of reciprocal distrust between Russia and our own country is based on the fear of each that the other may try to interfere with its domestic, economic, and political affairs.* Each purports to see the beam of meddlesome intervention in the other's eye, while it ignores the mote in its own. Thus the Soviet Union remembers that we participated in the foreign military intervention at the time of her civil revolution, and afterwards lent our support to successive boycotts of her trade, of her gold, and of her credit needs. For our part, we remember the Soviet Union's doctrine, and

aggressive support, of revolutionary international communism.

We feel that Russia should find satisfactory evidence of our present willingness to have her develop her internal institutions as she will in the aid that we have given her during the war, and in the record of our good-neighbor policy as applied to Latin America. She, no doubt, resents our lingering suspicions in the face of her declared policy of 1941 to refrain from any attempt to influence the political or economic structure of foreign nations. Certainly, each of us will need the repeated reassurance that can come only through sustained performance by the other in the years ahead. Meanwhile, much will be gained if each will give to the other's good faith the benefit of the doubt, while it scrupulously guards its own conduct to avoid even the appearance of backsliding.

2. *A second zone of suspicion is created by those measures which each of us interprets as natural and necessary bulwarks of national security when they are our own, but as evidence of dangerously aggressive imperialism when taken by the other.* In our view, at least, such demands as we have voiced for island trusteeships or for other naval bases appear mildly conservative as compared with Soviet claims for annexation of territory and for a general orbit of influence, under governments friendly to her, throughout eastern Europe in particular.

There can be no easy solution to that problem. Bi-focal vision, by which one nation can look through a second lens ground to the prescription of another, seldom is achieved in international affairs. The success of the San Francisco Conference will provide a mechanism for international definition of principles and procedures which at least might relieve the inevitable strains. Most important will be the record of how each of us proceeds in our respective courses of action. Soviet performance thus far is highly unsatisfactory to us. While we have taken pains to clear our procedure with her, she has taken action in the Baltic, in Austria, and in Poland without even advance notice to us.

A major test of our ability to cooperate may be found in the Allied administration of conquered Germany. The proposed four-headed control of a four-way partitioned nation promises to be at best an extremely awkward mechanism of administration. At worst, it can result in continuous and dangerous bickering between the representatives of Britain, France, the United States, and Russia in the Berlin coordinating center, and in hopelessly divergent procedures in their several zones of administration. There will be a compelling need for all of us to exercise all of the wisdom and cooperative resolve that we possibly can muster.

3. *A third testing ground for the future of American-Soviet relationships will be defined by the course of Russia in our continuing war with Japan. We are not unmindful of the toll paid by the Soviet Union in its magnificent European war effort. But we still are locked in a desperate struggle with an enemy that exemplifies the Fascism which America and Russia equally denounce. And that war is being fought in an area where Russian interests are importantly at stake.*

Russia has an extraordinary opportunity to create good will by throwing her weight speedily and effectively on our side. There is no doubt but that the final Pacific settlement will generate problems comparable with those of the European peace, but it is equally certain that the continuation of the European comradeship in arms can do much to promote an enduring and confident postwar friendship.

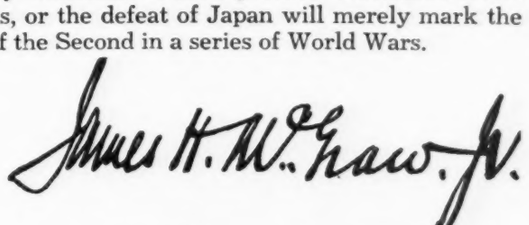
4. *A fourth, and highly important, potential source of suspicion and irritation is the intellectual blockade that the Soviet Union has maintained against the free flow of travel, intercourse, and exchange of ideas.* We can understand the genesis of this policy and the reasons for its continuance while Russia entertained a constant fear of attack by powerful enemies. But the sustained perpetuation of such a quarantine by so strong a nation as the present U.S.S.R. could not be accepted as a protective measure. Inevitably it would generate suspicion that it was rather an instrument of nationalistic isolation or even of contemplated aggression. A way-of-living, at arm's length, with a nation that maintains such intellectual quarantines is possible; any whole-hearted partnership of effort is quite impracticable.

5. *Trading between a free-enterprise nation and one that operates all foreign commerce as a government monopoly can give rise to many frictions.* That subject is too complicated for exposition here. Suffice it to say that, while difficult, it is not impossible to conduct such trade with mutual advantage. We are in a position to help Russia greatly with her program of industrial rehabilitation and expansion at great saving of cost in terms of her current scale of living. In return, we must have assurance that her government monopoly trading will be conducted for commercial rather than political ends, and that it will be used to encourage rather than to restrict multilateral and non-discriminatory world trade.

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This is a representative list of the major areas in which misunderstanding and distrust may be generated, or allayed, in Russian-American relationships. No doubt, an equally honest list drawn by a citizen of the Soviet Union would be more heavily weighted by those features of our behavior which irritate and stimulate distrust on their side. If such a catalog were to be presented, it should receive our most searching and responsible consideration.

For it is of utmost importance that our two nations, in concert with the other United Nations, learn how to get along in mutual confidence and respect. Our understanding of each other now is so imperfect that our negotiations are punctuated with continuous irritations over *little issues*. This, inevitably, will continue until such matters are submerged in the general confidence that can be achieved only through satisfactory settlement of the *big issues*. We must succeed in this, or the defeat of Japan will merely mark the end of the Second in a series of World Wars.



President, McGraw-Hill Publishing Co., Inc.

THIS IS THE 36TH OF A SERIES



FINE WATER SPRAY applied to surface during final rolling with 5-ton five-wheel balloon-tired roller makes up for evaporation losses during compaction with 10-ton three-wheel steel roller. As soon as surface pores have been closed by rubber-tired roller, drawn by pneumatic-tired tractor, bituminous curing compound is sprayed on concrete by two-wheel unit standing on fresh rolled concrete at right.

Hangar Apron and Runway Shoulders Paved With *Rolled Concrete*

WHILE IN CHARGE of construction operations for the Army throughout a large area of New York State, the Syracuse District of the U. S. Engineers in 1943 placed rolled concrete pavement in 56,000 sq.yd. of apron for a new flight hangar at the Buffalo airport and in 90,000 sq.yd. of shoulders, 30 ft. wide, flanking runways at the Rome Air Depot. At both locations, a lean-mix concrete of dry consistency was delivered to the subgrade by truck mixers, was struck off 1½ in. above finish grade by a self-propelled power grader and was compacted to 7-in. depth by 10-ton three-wheel steel rollers, followed by surface rolling with pneumatic-tired rollers to seal the pores in the concrete, after the surface had been lightly fogged with water to make up for evaporation losses.

Concrete Mixtures

Cement content of the mix was 4 sacks per cu.yd. at Buffalo and only 3½ sacks per cu.yd. at Rome. For both jobs, the cement contained Vinsol resin, an air-entraining agent interground with the cement during its manufacture. Aggregate at Buffalo conformed to federal specifications as to both gradation and quality. The Buffalo mixture, designed with 60 percent sand and 40 percent graded crushed limestone, contained about 7 percent moisture and had a zero slump. A high percentage of sand is necessary because of the dry consistency used in rolled concrete construction.

At Buffalo the concrete was batched off the reservation and was hauled to the site by a fleet of fourteen 4- and 6-cu.yd. truck mixers. The truck mixers delivered mixed batches directly to the subgrade, where the concrete was spread immediately by an eight-wheel-drive power grader, 1½ in. above finish grade. To compact the moist concrete, a 10-ton steel-wheel roller was run over the surface until no imprint was discernible at the edge of the rolier. A light fog of water then was applied to the surface to compensate for evaporation, and a 5-ton five-wheel balloon-tire roller was pulled over the surface by a pneumatic-tired tractor to provide kneading action and seal the pores. Immediately upon completion of this rolling, a bituminous curing compound was sprayed on the surface to seal in moisture during the curing period.

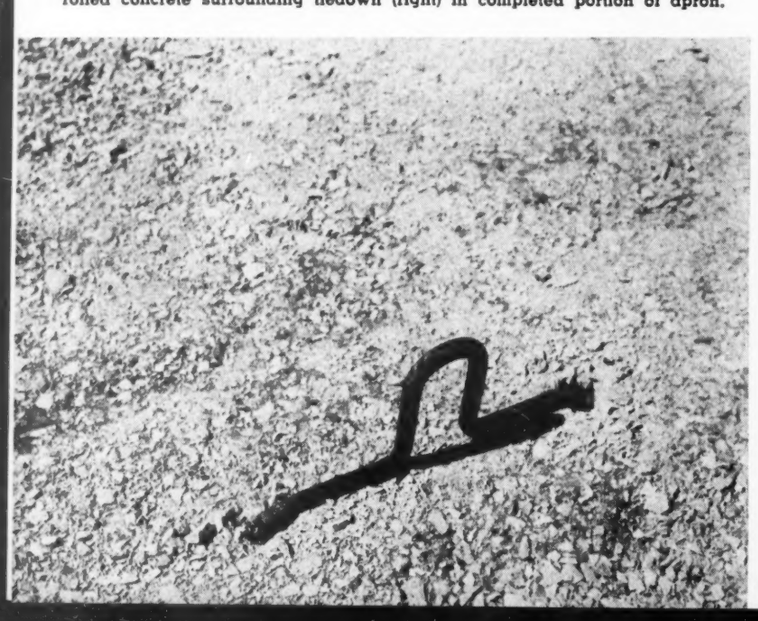
For the paved runway shoulders at the Rome air depot, the concrete mixture had a cement factor of 3½ sacks per cu.yd., and run-of-bank gravel of a specified gradation was used instead of processed aggregate. Methods of placing the rolled concrete were identical with those employed at Buffalo.

Pavement Performance

Rolled concrete placed in the runway shoulders has proved satisfactory for the purpose. In the hangar apron at Buffalo, about 10 percent of the surface of the rolled concrete has caused inconvenience

(Continued on page 164)

INSTALLATIONS OF TIEDOWN ANCHORS (below) in hangar apron indicate condition of rolled subgrade (left) before concrete is placed and surface of rolled concrete surrounding tiedown (right) in completed portion of apron.





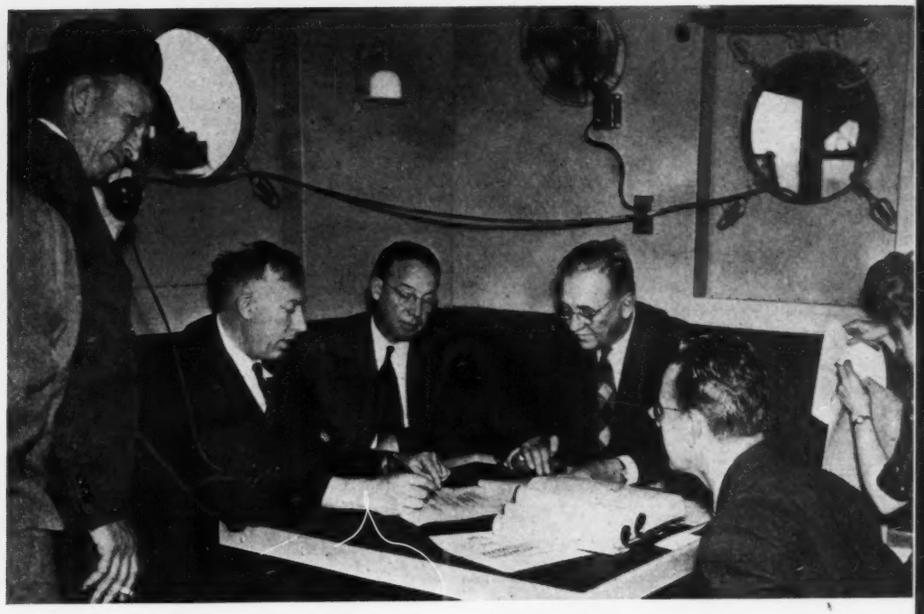
Present and Accounted For...A PAGE OF PERSONALITIES



NEWLY APPOINTED PUBLISHER of "Construction Methods" and "Engineering News-Record," constituting engineering-construction unit of McGraw-Hill publications, is ALBERT E. PAXTON, who has been serving as manager of the two magazines since 1937. After graduating from University of Illinois with B.S. degree in 1925 Mr. Paxton, native of Chicago, joined A. W. Shaw Co. and became editor of "Industrial Merchandising," later named "Industrial Distributor and Salesman." After Shaw company was purchased by McGraw-Hill in 1928 Mr. Paxton served as editor and later manager of "Mill Supplies," until in 1937 he became manager of "Construction Methods" and "Engineering News-Record."



STILL AT WORK at age of 93, D. W. C. NELSON recently began his third 4-yr. term as county surveyor of Baker, Ore. He continues to head survey crews, act as transitman and carry "gun" on field trips. Mr. Nelson has been engaged in civil engineering and mining in Baker since 1878.



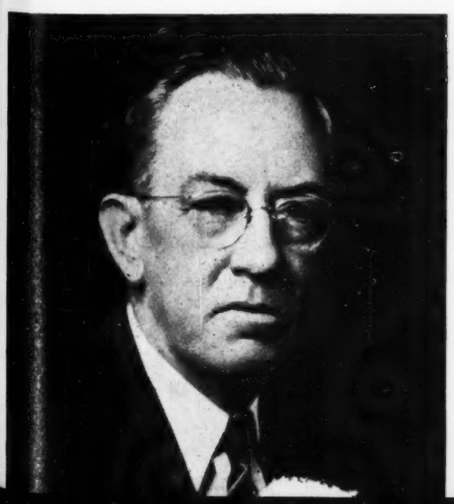
FORMAL SIGNING OVER of Elwood Hills, 8,250-hp. turko-electric tanker, to U. S. Maritime Commission, is accomplished at Marinship Corp., Sausalito, Calif. Participants in ceremony are (left to right), RAY L. HAMILTON, Marinship production manager; GEORGE A. PATTERSON, principal machinery inspector, who officially accepts ship for Maritime Commission; WILLIAM TAYLOR, port engineer, Pacific Tankers, Inc.; SYDNEY FORD, Marinship documentation officer; ALLAN CAMERON, port captain, Pacific Tankers, Inc., and ELVIRA HANNEVIG.



ELECTED PRESIDENT of New York Building Contractors and Mason Builders Association is WILLIAM JOSHUA BARNEY, president of W. J. Barney Corp., which specializes in industrial construction. He is past-president of Metropolitan Builders Association (New York Chapter of Associated General Contractors) and chairman of Apprenticeship Committee of Building Industry Employers of New York. Mr. Barney has served as treasurer of the New York Building Congress and is a member of the American Society of Civil Engineers.



NEW DIRECTOR OF RESEARCH and development work of Committee on Post-War Planning of American Society of Civil Engineers is OSCAR L. KING, former director of public service at Knoxville, Tenn. He succeeds Mark B. Owen, who resigned to become partner in Russell B. Moore Co., consulting engineers, Indianapolis, Ind. Mr. King has formerly served with Tennessee Highway Department.



PRESIDENT OF ALABAMA BRANCH of Associated General Contractors of America is RALPH A. SMALLMAN, who has been engaged in building construction in Birmingham for more than 20 yr.



THREE STARS are now worn by LIEUT. GEN. EUGENE REYBOLD, Chief of Engineers, U. S. Army, recently promoted from major general. General Reybold, who entered Army in 1908, after graduation from Delaware College, was appointed Chief of Engineers in August, 1941.

U. S. Army Photo


Just wad
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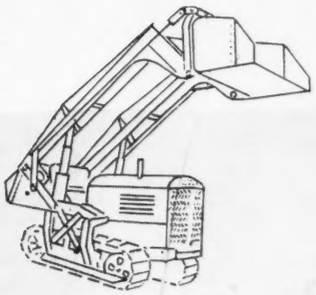


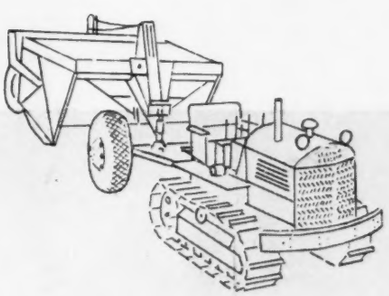
• They're right at home in water or mud, these husky Oliver "Cletrac" crawler tractors. The positive sealed construction of the lower track wheels keeps mud and water out . . . keeps oil in to protect against damage and wear. Each end of the bearing is fitted with a double dirt-oil seal, another Oliver "Cletrac" feature, that materially prolongs the life of the lower track wheels.

And, Oliver "Cletrac's" *controlled differential steering* is a big help when operating in mud or water, especially when the tractor is equipped with front-end loading equipment such as the Drott Bull Clam shown here. This exclusive principle means greater traction . . . less wear on steering parts. Power is never disconnected from either track when turning, assuring a steady flow of pushing or pulling power plus greater safety on hills and turns.

Oliver "Cletrac" tractors are ruggedly built for long, dependable service. Drop forged and rolled steel construction eliminates excess dead weight . . . adds strength. Their unusual accessibility makes maintenance a simple task. Substantial numbers of Oliver "Cletracs" are now being released for essential service. Your Oliver "Cletrac" dealer will gladly assist you in making application for a new tractor. **The OLIVER Corporation,** Industrial Division, 19300 Euclid Avenue, Cleveland, Ohio.

VER-Cletrac





THE OLIVER CORPORATION

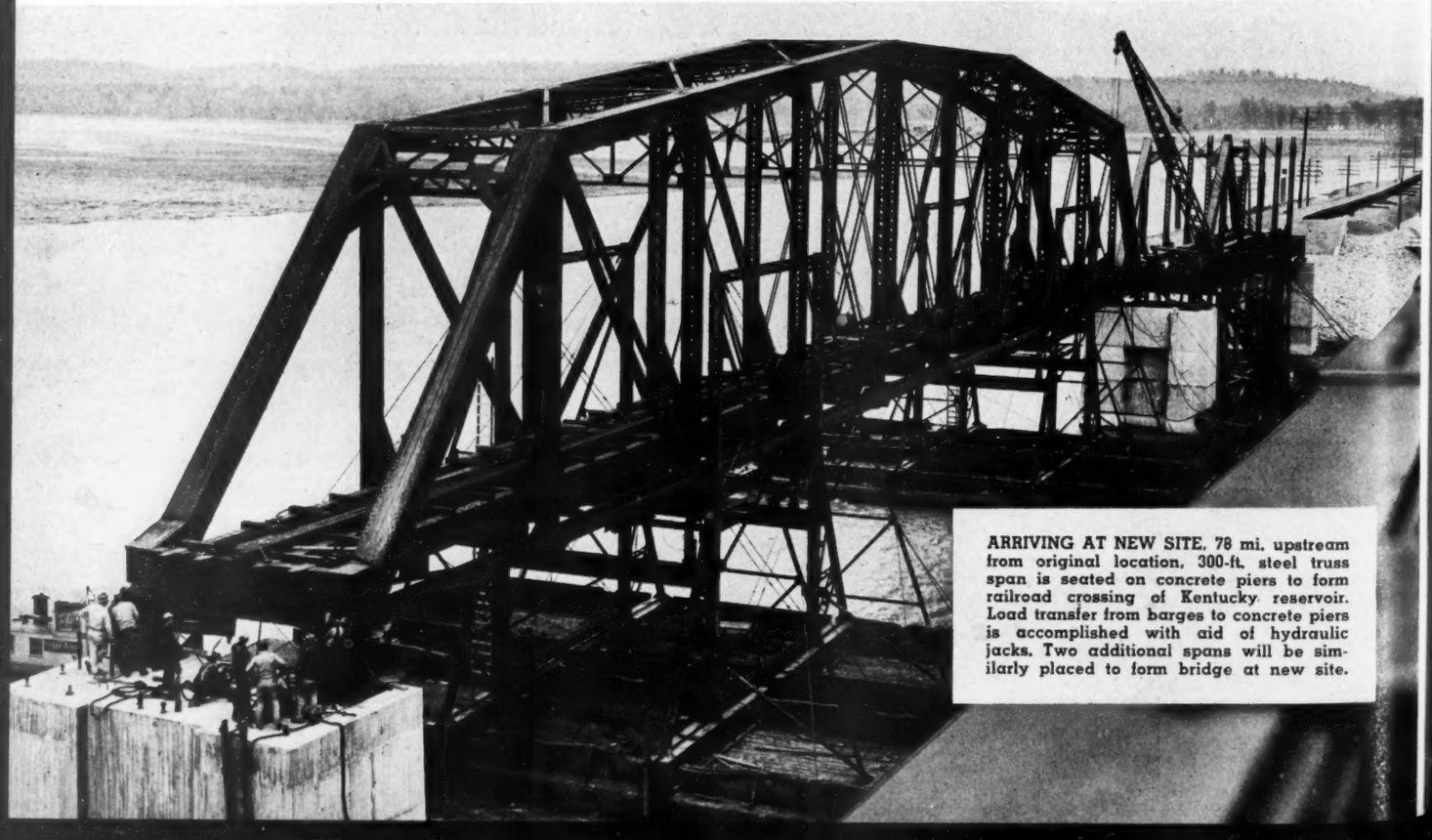


LOADED ON BARGES, first of three 300-ft. span railroad bridge trusses, salvaged by TVA from abandoned Illinois Central structure below Kentucky Dam, starts an 78-mi. journey upstream to new location where it will form N. C. & St. L. Railroad crossing of Kentucky reservoir at Trotter's Landing, near Camden, Tenn.

Bridge Spans Salvaged

Moved 78 Miles Upstream to New Site and Re-Erected by TVA

CONSTRUCTION OF KENTUCKY DAM by forces of the Tennessee Valley Authority rendered useless at its original site below the dam the Illinois Central Railroad's bridge of three 300-ft. steel truss spans. Instead of scrapping the structure it has been salvaged by removing the three trusses from their piers, loading them on barges and towing them 78 mi. upstream for re-erection over the Kentucky reservoir at a new site serving the N.C. & St. L. Railroad at Trotter's Landing, near Camden, Tenn. The accompanying photographs illustrate how the job was handled.



ARRIVING AT NEW SITE. 78 mi. upstream from original location, 300-ft. steel truss span is seated on concrete piers to form railroad crossing of Kentucky reservoir. Load transfer from barges to concrete piers is accomplished with aid of hydraulic jacks. Two additional spans will be similarly placed to form bridge at new site.

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE



J&L
PERMASET
WIRE
ROPE

Built with Precision to serve you with profit • Like a transit, J&L Wire Rope is precisionbilt. It is built from J&L Controlled Quality Steel . . . by men of skill and experience . . . on machines of the latest design. This combination naturally produces for you wire rope that works better, lasts longer, returns you greater profit on your investment in equipment.

J&L STEEL

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GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

Heavy Grading

In Soft Ground Done With

Self-Propelled Earth Movers



SOFT BOTTOM CONDITIONS are indicated by position of tire in right foreground. This is 21.00x24 tire.

GRADING WAS NOT THE LARGEST ITEM in carrying out a job for the Navy on Rough and Ready Island in the San Joaquin River at Stockton, Calif., but it did involve some heavy hauls. The project as a whole, officially known as the U. S. Navy Supply Depot Annex, involves several types of construction and is a $20,000,000 job. It was undertaken late last fall as a joint venture by a combination of three firms: Ford J. Twaits Co., Morrison-Knudsen Co., Inc. and Ben C. Gerwick, Inc. Each of these three firms took that major division of the project that was best suited to its own organization and equipment. Building construction was handled by Twaits; wharf construction and waterfront development by Gerwick; and the grading job, which involved moving about 1,000,000 cu.yd. of earth, by Morrison-Knudsen.

For the earth moving job, illustrated in the accompanying pictures, the endeavor was made to assemble equipment that could operate effectively on soft ground. In bidding the job, the contractors had arranged to buy top soil from a nearby area of overflow land where a 5-ft. layer of sediment had been deposited by river floods. As the work was begun not long before the rainy season and as the island's water table is high (the maximum elevation on the island is about 13 ft.) it was anticipated that when the rains came the ground would be extremely soft. How wet it became is indicated by an item in the contractor's records referring to the distribution from the company warehouse of "980 pairs of hip and knee boots and 767 slickers and rain suits to men who lacked such apparel."

Principal items of equipment brought together for this earth moving job were six Wooldridge Terra Cobras, each with a bowl capacity of 18 cu.yd., three Caterpillar bulldozers, a grader and two carrying scrapers.

The Terra Cobras, which weigh 42,500 lb. each, are equipped with 21.00x24 pneumatic tires, the same size being used all around for convenience in interchangeability. In referring to these units, the manufacturers point out that they should be classed as "earth movers" to indicate that they are self-propelled, thus distinguishing them from tractor-hauled carrying scrapers.



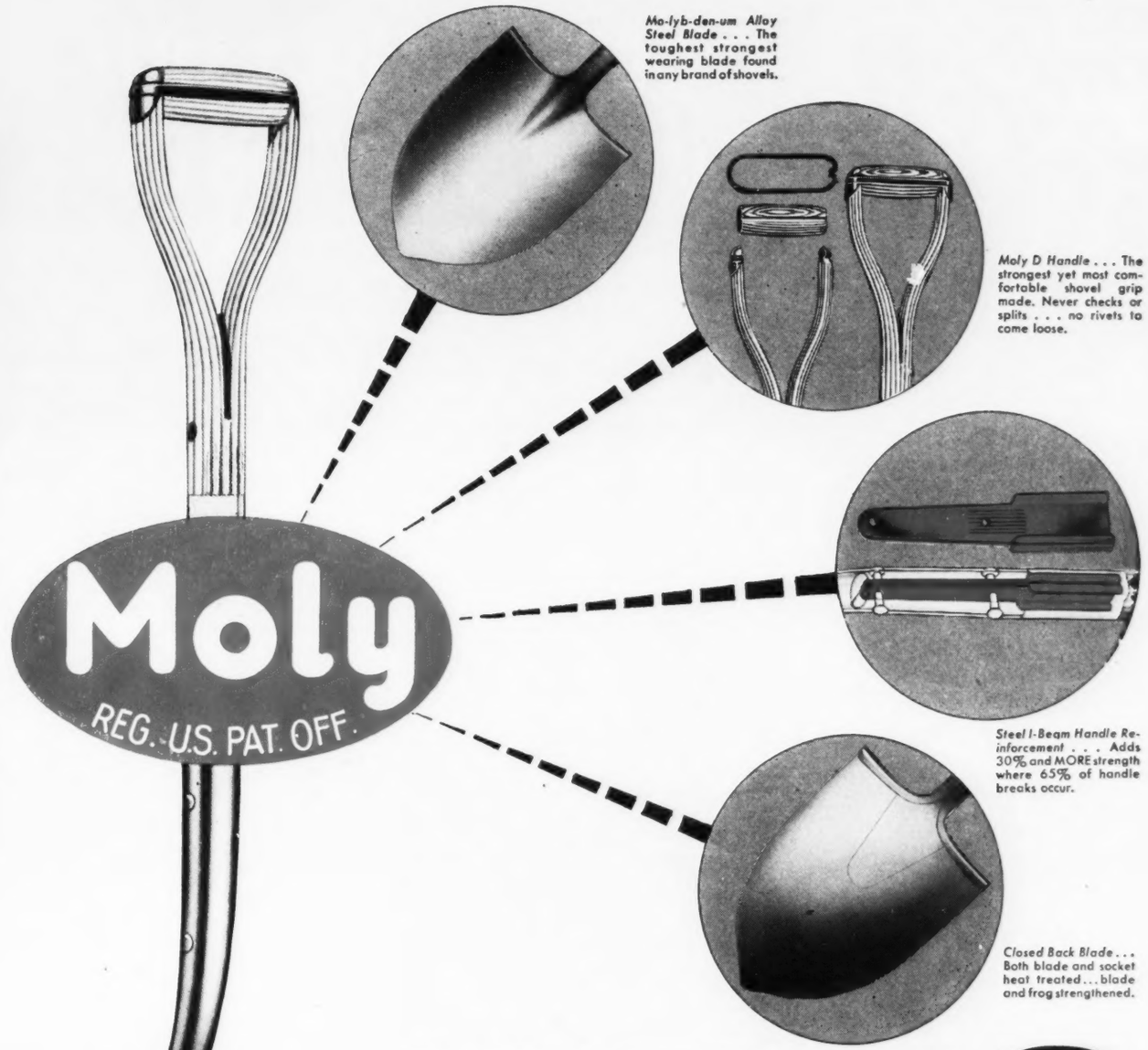
BRAKING EFFECT is created by lowering bowl of high-speed (22 mi. per hr.) Terra Cobra earth mover unit so that it drags on ground.

The Rough and Ready job illustrates

(Continued on page 174)

COMING AND GOING in cut (below) where 18-cu.yd. Terra Cobras are stripping off 5-ft. top soil layer.





Mo-lyb-den-um Alloy Steel Blade . . . The toughest strongest wearing blade found in any brand of shovels.

Moly D Handle . . . The strongest yet most comfortable shovel grip made. Never checks or splits . . . no rivets to come loose.

Steel I-Beam Handle Reinforcement . . . Adds 30% and MORE strength where 65% of handle breaks occur.

Closed Back Blade . . . Both blade and socket heat treated . . . blade and frog strengthened.

THEY ALL ADD UP TO Moly REG. US PAT OFF

The Finest Shovel Made

Moly shovels and scoops are all around better because each point of strain and wear is specially reinforced by an exclusive construction feature originated and developed by the Wood organization. Compare a Moly from end to end with any other shovel made and you'll find Moly markedly superior in ways that you can actually see.

Under normal conditions Moly shovels and scoops are available in the exact type and size required for the individual job. Get the habit now of specifying Moly when you buy shovels . . . because the name Moly on the order means final shovel costs which are lower.

THE WOOD SHOVEL AND TOOL COMPANY, PIQUA, OHIO

A National Organization *Specializing Exclusively* in Shovels, Spades and Scoops

MO-LYB-DEN-UM ALLOY SHOVELS

BETTER CONCRETE

FASTER

WITH INTERCHANGEABLE

VIBER VIBRATORS

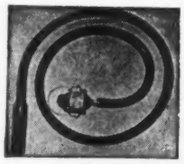
9500 R.P.M. IN CONCRETE

The list of contractors who use Viber equipment, and the projects on which it has been used, includes the outstanding names in the construction world! The complete *interchangeability* of Viber equipment, enabling you to add units as desired, or to change them to suit conditions on the job, is another feature that adds to the efficiency of this job-tested equipment, as well as reducing the investment cost.

AIR

• FLEXIBLE PNEUMATIC VIBRATOR

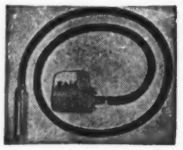
Made in 1¾", 2⅛" and 3" diameter with 12 ft. and 21 ft. flexible shaft. Complete interchangeability of flexible casings, Cores, vibrators. Operates on 80 lbs. pressure.



ELECTRIC

• FLEXIBLE ELECTRIC VIBRATOR

Made in 1¾", 2⅛" and 3" diameter with 12 ft. and 21 ft. flexible shaft. Complete interchangeability — Flexible Casings, Cores, Vibrators, Universal type motor. Built-in protective "ground."



GAS

NEW FEATURES "GAS" VIBRATOR

Mercury clutch, entirely automatic, picks up load at 1500 r.p.m. allowing engine to idle without running vibrator, eliminates stalling, makes starting easy in cold weather.

Upsetting is practically eliminated in mounting. Handles allow complete unit to be easily carried.





NEW CATALOG

Illustrates and describes the latest Viber equipment — gives complete data on casings, cores, speeds, power, weight, etc. Also new features. Also list of users and jobs where used. Write for your copy today.

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726 South Flower St.

BURBANK, CALIFORNIA

CONSTRUCTION EQUIPMENT NEWS

JUNE, 1945 REVIEW of Construction Machinery and Materials

LOW-SLUMP CONCRETE is mixed and discharged successfully by new line of truck mixers, as indicated by performance photograph of 2-yd. high-discharge mixer showing slump test of concrete being discharged. Successful mixing of dry mixes is achieved through refinements in drum shape and



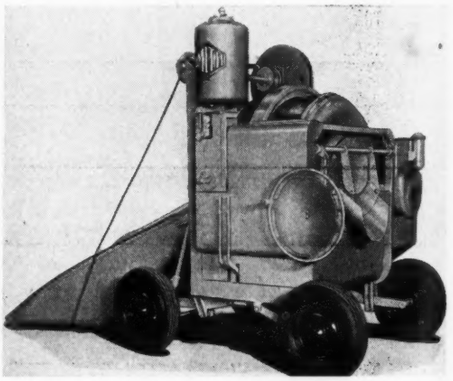
in blade size and location. Interchangeable die-formed blades are bolted on to facilitate replacement. Discharging speed has been improved, most noticeably in discharging concrete mixes of lower slumps. New line consists of 2-yd., 3-yd. and 4½-yd. mixers meeting Truck Mixer Manufacturers' Association standards for drum volume and batch rating, with corresponding rated capacities, when mixers are used as agitators, of 3 yd., 4½ yd. and 6⅛ yd. Each mixer is equipped with water tank having shutoff of exclusive, special design for accurate, automatic measurement of both initial amount of mixing water and any additional amount needed to compensate for reduced moisture in aggregate.—**Chain Belt Co., Milwaukee 4, Wis.**

★ ★ ★

MASONRY CEMENT, result of detailed analysis of properties desired by masons in different parts of the country and a series of tests which show that product has requisite properties to high degree, is now available in multi-wall paper bags containing 70 lb. net or 1 cu. ft. Also shipped in carloads or in mixed cars with Lone Star Portland Cement and "Incor" 24-hr. cement. It was found from various tests that cement has six principal qualities particularly desired in this type of product by masons—plasticity, high water retention, strong bond, controlled setting time, water repellency and ability to hold water. Lone Star masonry cement exceeds requirements of Federal specification SS-C-18 lb. and A.S.T.M. specification C 91-44J.—**Lone Star Cement Corp., 342 Madison Ave., New York 17, N. Y.**

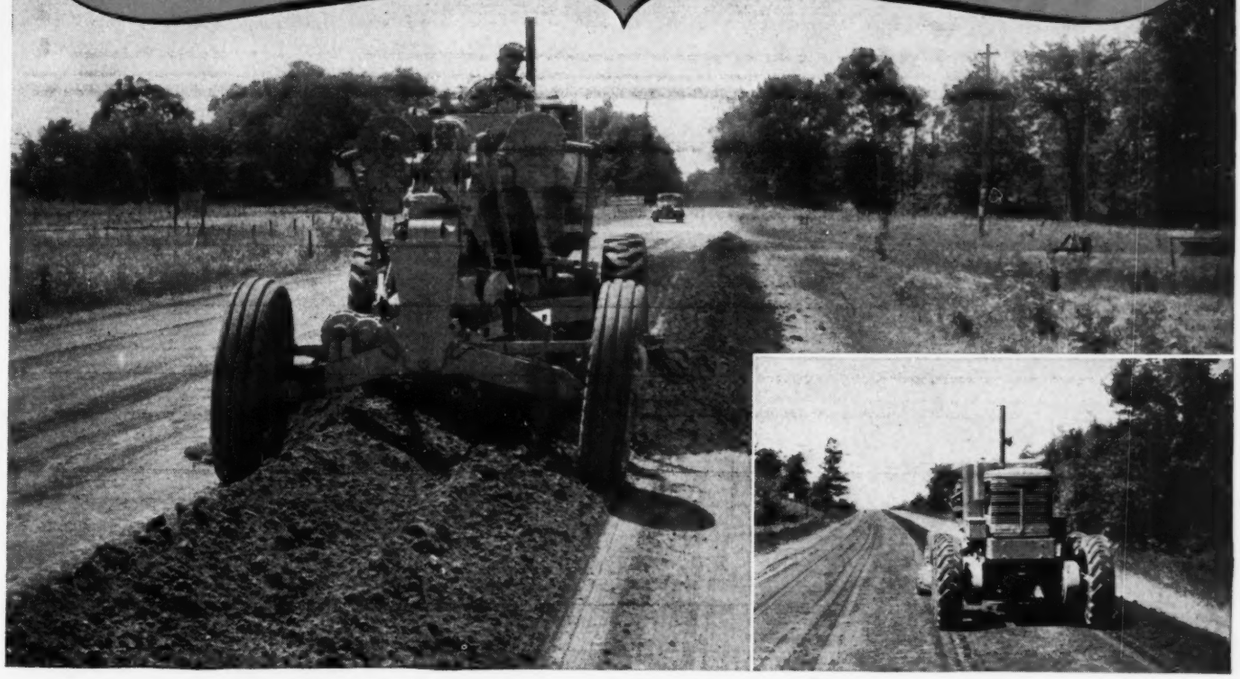
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14-S CONCRETE MIXER, styled for appearance, durability and dependable operation, has welded hollow box-girder frame mounted on knee-action truck with each wheel individually sprung, permitting fast, smooth towing even over rough ground. Reduced 1,400 lb. in weight as compared with previous model, new mixer weighs 6,030 lb. complete with power loader, water tank, low-



pressure pneumatic tires and Wisconsin BF 4 air-cooled 25-hp. gasoline engine. Water tank on operator's side of mixer has vernier control which can be set to pints. Where needed, water pump can be installed in about 15 min. by removing cap screws of input shaft bearing plate and attaching pump. Open-end-type skip has arched cover plate which reduces mixer charging time about 4 sec. in comparison with flat cover plate. Transmission, hoist and power plant are in one self-contained unit, with shaft always in alignment. Engine is direct-connected to transmission case which contains speed reduction gears, drum drive and power loader clutch. Machine is fully equipped with anti-friction bearings and heat-treated gears, with all gears running in oil except drum drive and hoist drive.—**T. L. Smith Co., 2835 N. 32nd St., Milwaukee 10, Wis.**

Speed Road-Mix Operations with ADAMS MOTOR GRADERS

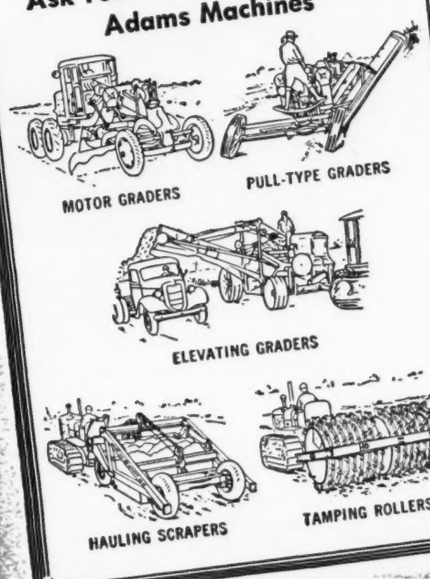


★ THREE IMPORTANT FEATURES combine to make Adams Heavy-Duty Motor Graders outstanding favorites for all types of road-mix work—scarifying, mixing, spreading:

1. The abundance of power and traction it takes to move large windrows of heavy materials . . . easily!
2. 8 overlapping forward speeds which provide the proper speed for fast mixing action in any material.
3. The positive, rigid blade control needed for uniform spreading, insuring smooth surface finishes.

You'll find husky, high-speed Adams Motor Graders ideal for all manner of surface, ditch and bank work—providing fast, economical construction and maintenance operations on roads, airports and similar projects. See your nearest Adams dealer for complete details.

Ask Your Dealer About These Adams Machines



J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

The only thing we want from a tire is *mileage*



FRANK B. CARBONE, *Vice Pres.*
Colonial Sand & Stone Co., Inc.,
New York, N. Y.

● "Our operations call for heavy duty truck work; hauling tons of building material in and out of excavations and construction projects is a job requiring tires that are plenty tough. We have used Armstrong Tires since 1937 and found that they give us the only thing we want from a tire—mileage! And more mileage means lower tire cost to us."





SINCE 1912 hundreds of commercial car operators have learned that *you can't buy a better tire than an Armstrong!* For years, we have pioneered in making tires that wear longer and cost less. You can count on an Armstrong to give you a tire that will perform better, last longer, stand up under all conditions and cost you less per mile of use! That's not a statement—it's a promise, a promise backed by the thirty-year integrity of the manufacturer.

For literature or information write your Armstrong distributor or to Armstrong Rubber Company.

ARMSTRONG TIRES

Manufacturers of Quality Tires and Tubes Since 1912 · General Offices and Plant—460 Elm Street, West Haven 16, Conn.

DEPENDABLE EQUIPMENT

That Saves Seconds and Builds Profits!

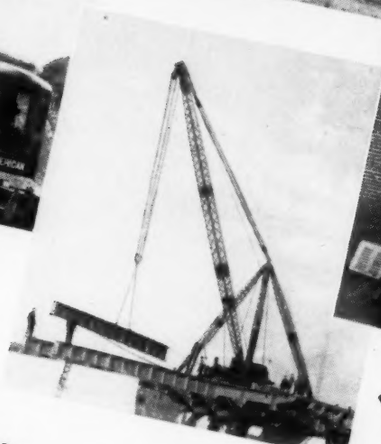


HOISTS. A complete line of 1, 2, 3 and 4-drum types in capacities up to 250 tons. Steam, gasoline, Diesel or electric powered.

LOCOMOTIVE CRANES. Capacities from 20 to 40 tons with boom lengths up to 100 feet. Diesel, Diesel-electric, gasoline and steam types.









REVOLVERS. Designed to the speed and capacity requirements of the particular project and with many mechanical superiorities.

DERRICKS. Guy, stiffleg, steel erectors, gin pole, gallows frame, barge and special types. Choice of size, boom length and capacity.



BLOCKS AND SHEAVES. Types and sizes for every kind of wire rope service. All have heavier pins and axles and oversized forged hooks and shackles.

WE'RE CONCENTRATING *on making operators' and workmen's jobs easier and their time more productive. All movements and controls of American materials handling equipment for the construction industry have been designed or are being redesigned with this currently important advantage in mind.*

Ways of saving time for the construction industry have always been our primary objective. We constantly strive to slash seconds from operating cycles . . . move bigger loads faster . . . plan for easy assembly and erection . . . build equipment to give *better* service than expected. Be sure to talk over all your important jobs with an American field engineer *before you quote.*

AMERICAN **MATERIALS HANDLING** *for* **EVERY INDUSTRY**

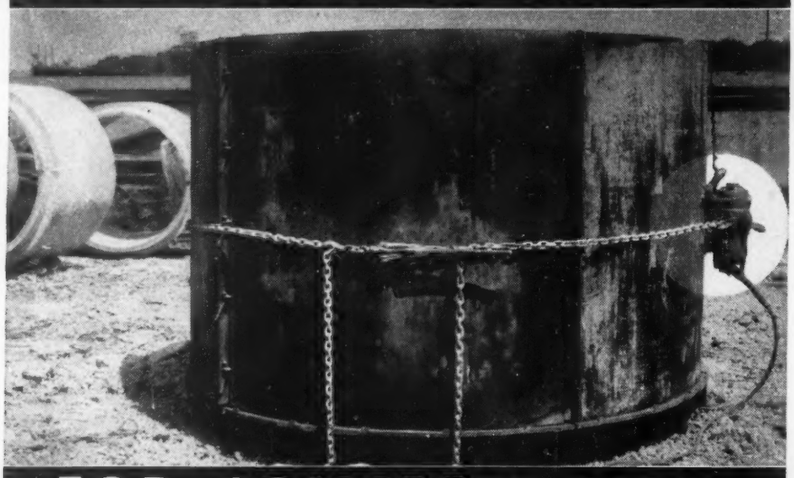
AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

Use JACKSON
PIPE FORM VIBRATORS



FOR CONCRETE PIPE
of
HIGH STRENGTH
GREAT DENSITY
and
GOOD APPEARANCE
at
LOWER COST

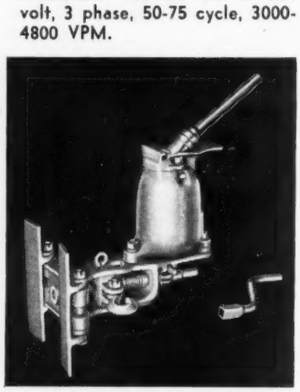


Try a JACKSON Vibratory Concrete Pipe Machine and you will quickly discover that it will not only repay its cost many, many times, but also enable you to fully meet the increasingly exacting pipe specifications for impermeability and compressive strength. Stronger concrete can be produced with less cement (as less water is needed). Slumps of 1" and lower are readily placed with JACKSON machines. Spading or puddling costs are greatly reduced and forms can be stripped earlier owing to the use of less mixing water and greater consolidation. Moreover reinforcing steel can be accurately placed and held in position.

JACKSON Pipe Vibrators make possible the manufacture of highest quality plain or reinforced concrete pipe on the job, adjacent to the pipe line construction. Maximum production economies may thus be effected, with transportation costs to the laying site largely eliminated. Recommendations for practicing the VIBRO-CAST method with JACKSON Pipe Machines are yours for the asking. Write for them.

The Improved — Heavy Duty
Model PTV-21A

A heavy duty unit for use on pipe forms from 36" to 120" diameters. 110-130 volt or 220 volt, 3 phase, 50-75 cycle, 3000-4800 VPM.

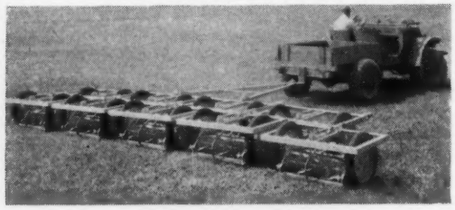


STANDARD Model PV-4

Best suited to pipe of 24" to 36" diameters. 110 or 130 volt, 3 phase, 50-75 cycle, A.C. 3000-4800 VPM.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

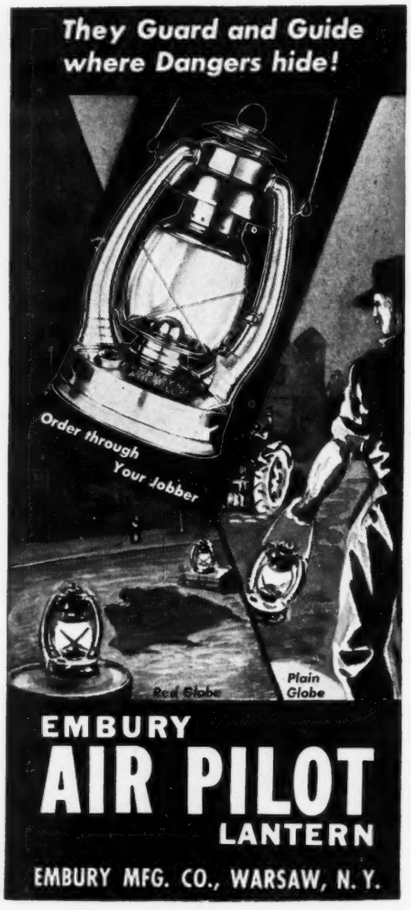
AIRFIELD MOWER, called "Grass Blitzer," is built in three-, five-, seven- and nine-gang mowing units and may be hauled by tractor or truck. Efficient cutting speed is obtained up to 20 mph. Nine-gang

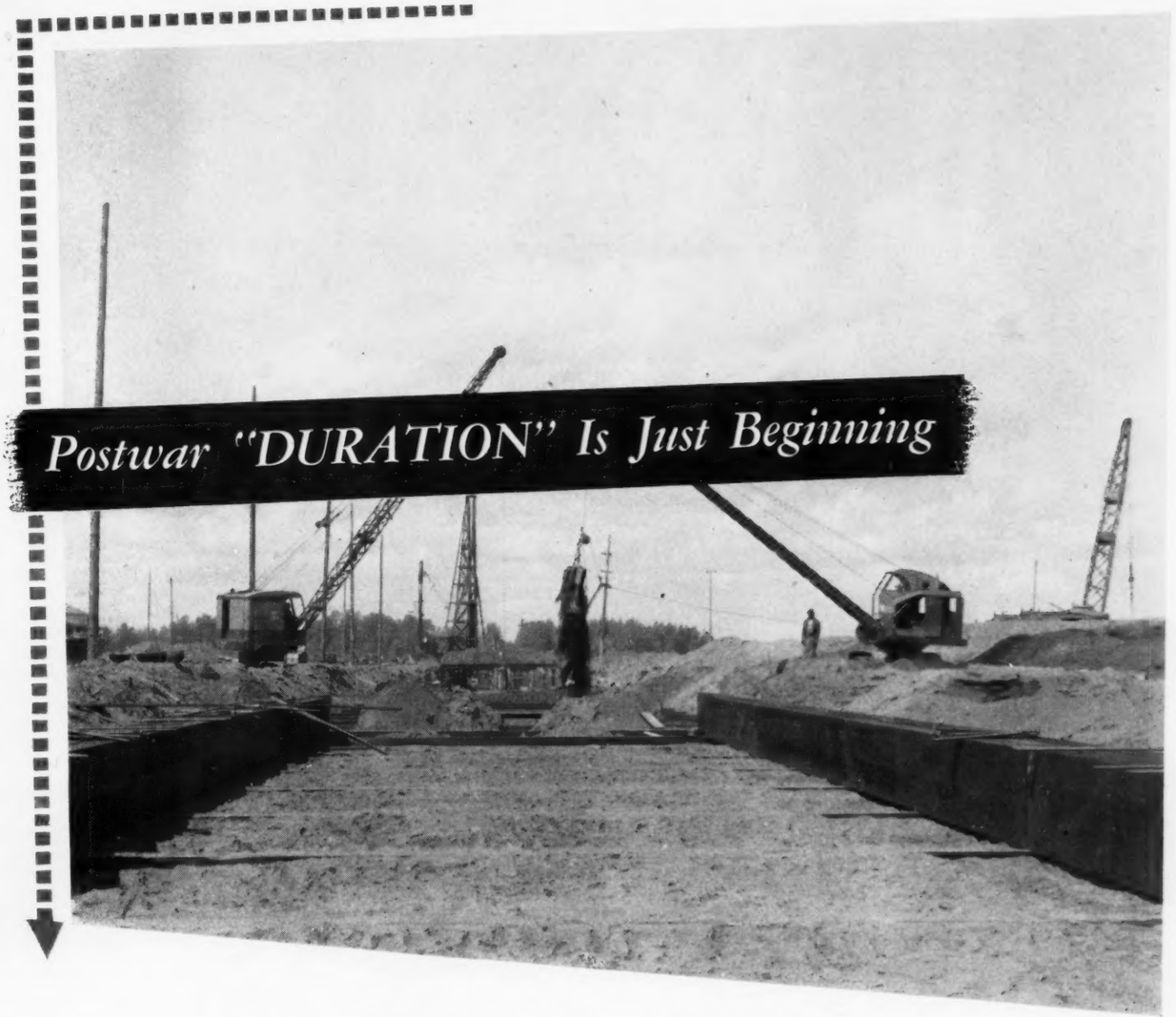


mower cuts a 21-ft. swath or approximately 368 acres per 8-hr. day. Transport trailer is available for carrying mowing units to other locations at high speed.—**Worthington Mower Co., Stroudsburg, Pa.**

★ ★ ★

PROCESSED COVER GLASSES for welding helmets, regular size (2x4½ in.) have been treated with a protective coating to guard against heat breakage and damage from metal spatter. They are completely covered on both sides with this tough, baked-on protective coating which will not pit, peel nor rub off. Claimed to save many minutes per worker, per day required to replace broken or pitted glasses. Welders say they outlast eight to fifteen ordinary glasses.—**Industrial Products Co., 2620 N. Fourth St., Philadelphia 33, Pa.**



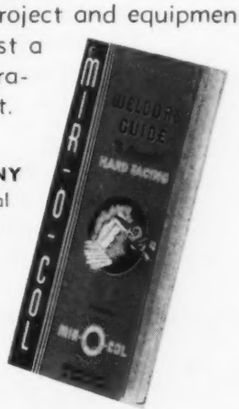


The construction industry's meaning of "Duration" will always be a "length of life" measured in work-hour efficiency of equipment.

During war-time economy, operators—both combat and civilian—applied MIR-O-COL metals by welding methods to hard-face edges of scraper blades, bucket teeth and other wear points of construction apparatus. Because of the tough-hardness compounded in the metal rods, useful life of metal-to-earth contact parts increased many times. On battle and home fronts MIR-O-COL hard-facing stood as a protective film—resisting abrasion and impact—withstanding more operational abuse—saving countless hours of down time for maintenance and replacement.

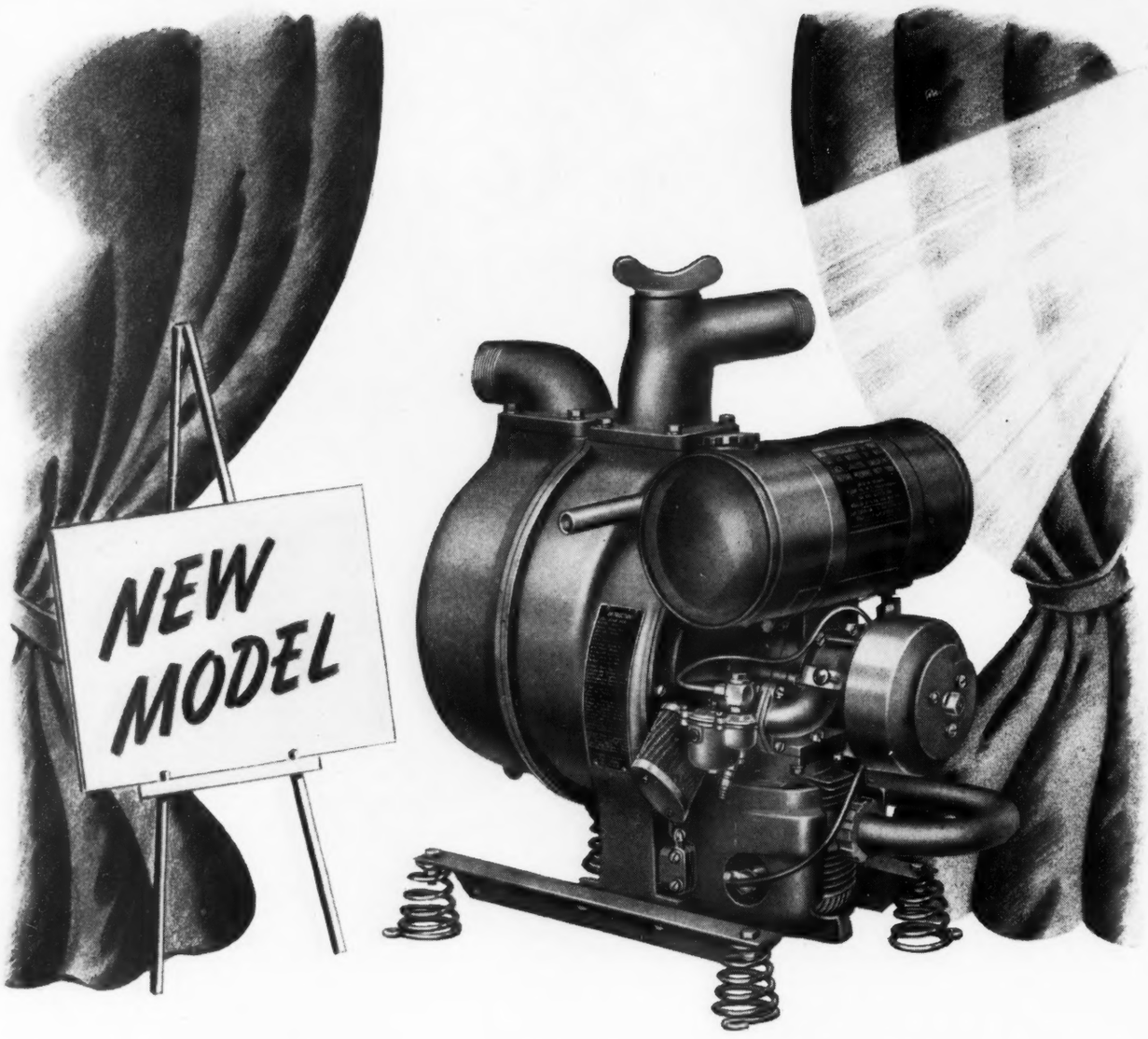
Compounded in the foundry with skill born of long experience in combining metals, these rods are available through distributors in types and sizes required for application on all classes of equipment.

Operators producing on the competitive market of "tomorrow" will be able to use MIR-O-COL hard-facing to protect both the project and equipment "for the duration." Not just a "duration" of war, but a "duration of production" at a profit.



WRITE TO MIR-O-COL ALLOY COMPANY
today. Learn more about the use of "Special Alloys for Production Purposes." A copy of "Weldor's Guide to Successful Hard-Facing" will be sent FREE at your request.

MIR-O-COL
HARD-FACING RODS
ALLOY COMPANY
2416-60 EAST 53RD STREET, LOS ANGELES, CALIFORNIA



NOW you can get a NEW Homelite Portable Pump

The new Model HR Homelite Self-priming Pumps are now coming off our production line.

However, only a few are being built... a limited quantity each month for essential civilian use. Your priority rating is your "ration coupon."



True to Homelite standards, these gasoline-engine-driven self-priming pumps are easily portable and extremely rugged. They have a large capacity . . . 28 foot suction lift . . . keep seepage at strainer level . . . and are non-clogging, foolproof and weatherproof. A new engine design gives increased power . . . with a reduction in weight.

These new Homelite Pumps can be furnished with fittings for 2″ or 3″ hose . . . and the two size fittings are interchangeable.

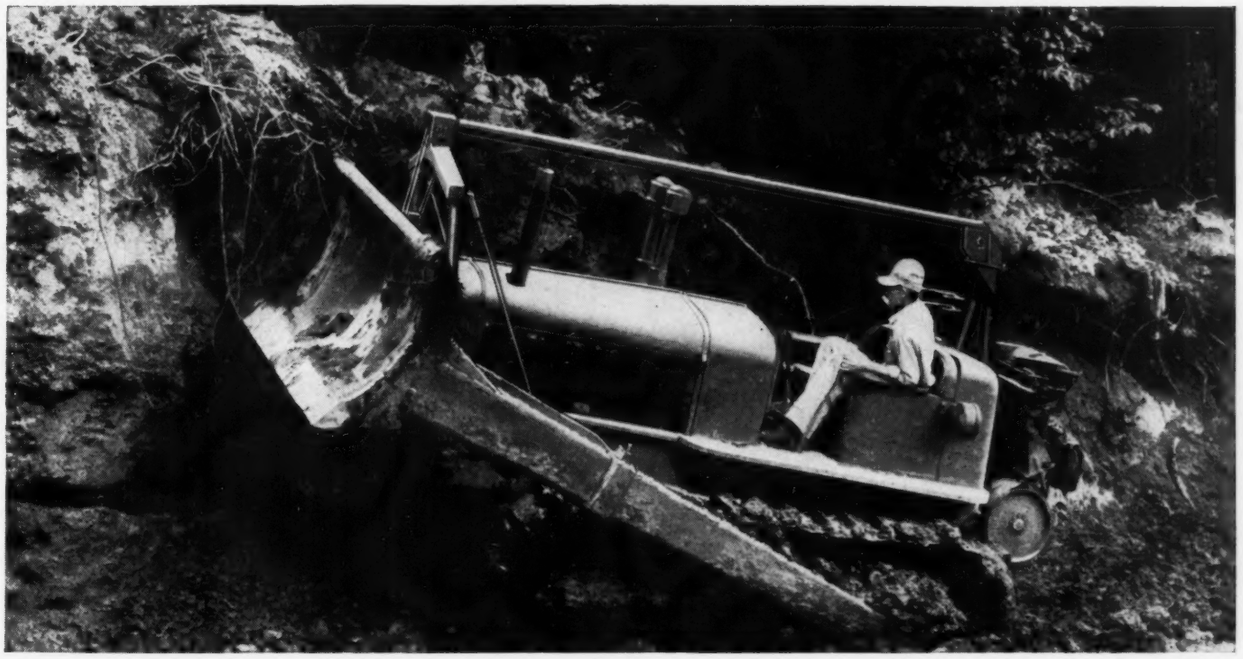
Write today for complete information and prices on these new Model HR Homelite Portable Pumps. Don't forget to give us your priority rating.

HOMELITE CORPORATION

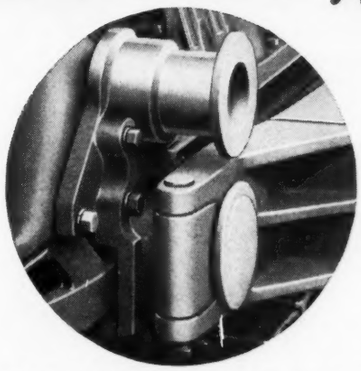
PORT CHESTER, NEW YORK

***PORTABLE* PUMPS • GENERATORS • BLOWERS**

a NEW and TOUGHER Buckeye Dozer...



that does ALL DOZING jobs better



Detail of exclusive double trunnion mounting which permits either end of dozer blade to be tilted 12" by attaching one push arm to the top trunnion while the other is attached to the lower trunnion on the other side.

HERE'S the new Buckeye dozer that is turning those tough jobs into pushovers. Its rugged moldboard uproots stubborn stumps, digs out massive boulders and rolls huge quantities of earth day after day with never more than the minimum of maintenance. Heavy reinforcing ribs on moldboard and push plate assure permanent rigidity. Simple design eliminates excess weight so there's more power for handling bigger payloads. Buckeye balance keeps full length of crawlers on the ground for maximum traction and reduces wear on idlers and rollers. The new exclusive double trunnion mounting provides an entirely different method of tilting the moldboard and changing the digging angle to take full advantage of working conditions. Rigidity is maintained in every position. Now is the time to find out about your postwar dozer.

See your Buckeye distributor for details or write direct.

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio



Convertible Shovels



Trenchers



Tractor Equipment



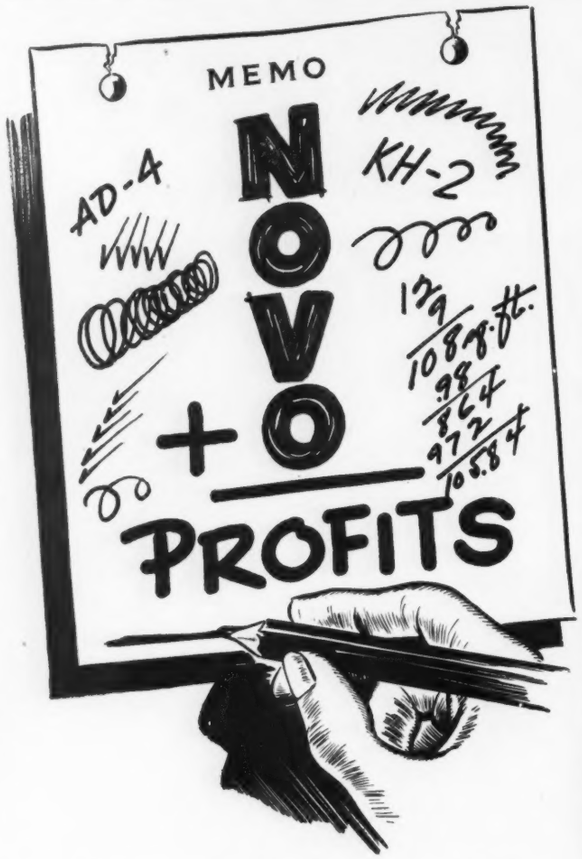
Road Wideners



R-B Finegraders



Spreaders



Mr. Contractor, don't trust to memory . . . put it in writing! Make a memorandum to investigate Novo Contractors' Equipment for your next Construction Job.

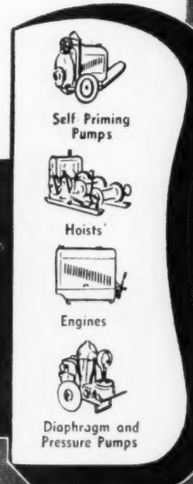
Novo's complete line of Contractors' Equipment includes Engines . . . Self-Priming, Diaphragm and Pressure Pumps . . . Hoists . . . Generator Sets . . . and Pavement Breakers. Every model is backed by over 40 years of experience and know-how!

When you figure on your next contract, figure on Novo Equipment . . . the Contractors' Equipment PLUS!

ATTENTION, DISTRIBUTORS

Some Novo territories are still available. For complete information, write, wire or phone the Sales Department.

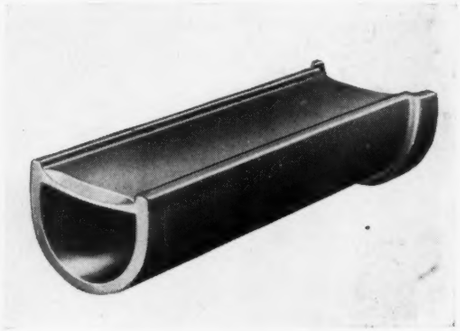
Allied Member of A.E.D.



NOVO ENGINE CO.

LANSING 5, MICHIGAN

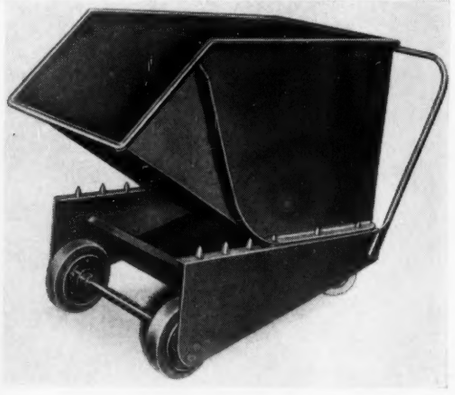
VITRIFIED CLAY SKIP-PIPE was used to drain two strips of road near the town of Sandwich, Mass. where sub-surface water was causing the subgrade to become wet and spongy. A trench about 3½ ft. deep was excavated and 2 in. of stone was laid along the floor. On this base skip-pipe was installed and the trench filled with gravel to within a foot of the surface. Next a layer of heavy paper, burlap and cloth bags was placed, followed by several inches of coarse



gravel. Top soil from the original excavation was used to fill in the last 6 in. and finally the surface was seeded. The following winter, inspection was made of these sections and according to reports, they were entirely dry. An investigation was made of the outlet after three weeks during which no rain had fallen and it was found that a small stream of water was trickling from the skip-pipe into the basin. Skip-pipe is specially designed to handle the problem of permanent fast-flowing sub-surface drainage. Advantages: Drains at higher velocity, starts flowing sooner and continues to discharge longer because of its cradle design construction, will not rust, corrode or disintegrate, is impervious to action of deteriorating agencies, has great structural strength, is low in cost and economical to lay.—**Robinson Clay Products Co., Akron, Ohio or W. S. Dickey Clay Manufacturing Co. Kansas City, Mo.**

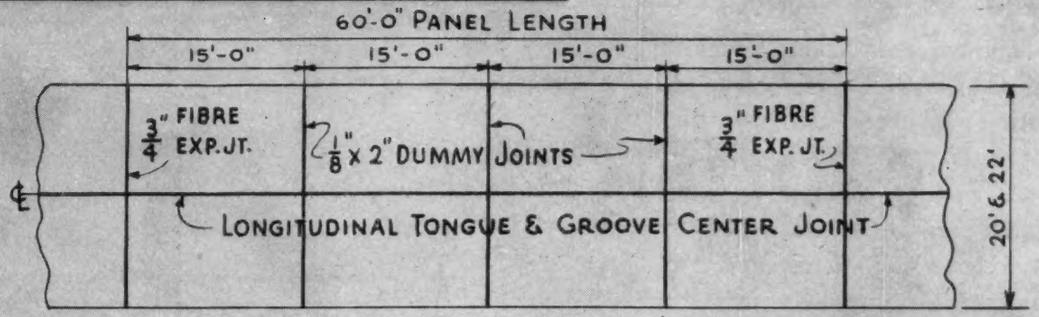
★ ★ ★

HAND-PUSH DUMP CAR, ½-cu.yd. capacity, known as Junior Phil-Dump car, has been added to the line of Phil-Dump haulage equipment and



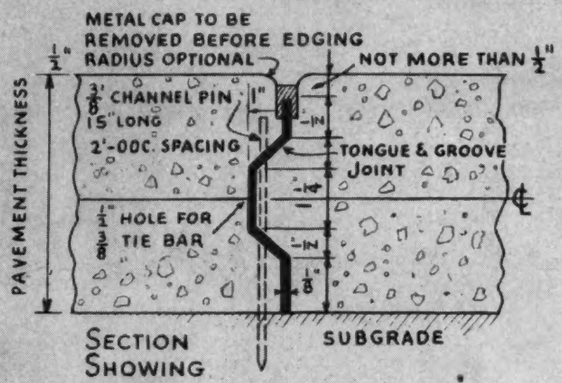
is available with solid rubber tires only. Overall dimensions, 66 in. long, 38¼ in. high and 24¼ in. wide.—**Phillips Mine and Mill Supply Co., Pittsburgh, Pa.**

Plan No. 2

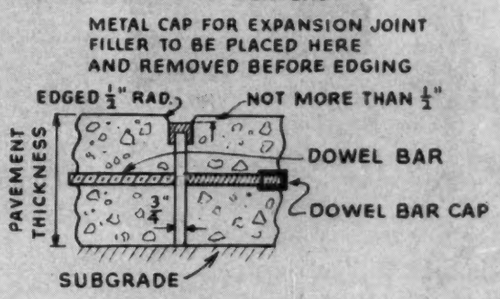


PLAN OF PAVEMENT SHOWING JOINTS

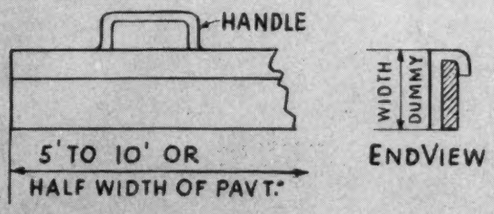
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS

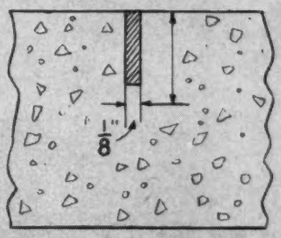


SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT



SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT





SECTION SHOWING DUMMY JOINT

NOTE:-ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42

LONGITUDINAL CENTER JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED DUMMY JOINTS SHALL BE MADE FROM KEYSTONE ASPHALT MASTIC BOARD. WIDTH CAN VARY FROM 2" TO 1/2 PAVT. THICKNESS

DETAILS OF PAVEMENT SHOWING JOINT LAYOUT · SUGGESTION NO. 2

KEYSTONE ASPHALT PRODUCTS CO.

CHICAGO, ILL. JAN. 15' 45. T.R.J.

PLAN No. 2 is designed for those engineers who prefer to use dummy joint as a contraction joint rather than Keystone's Tongue and Groove Center strip as suggested in Plan No. 1. In this alternate plan, Keystone Mastic Board Dummy Joint is used as a contraction joint to create the "plane of weakness". Keystone Tongue and Groove Joint is used for center strip.

When the plane of weakness type of joint is preferred by the engineering authorities, the Keystone method of installing permits these joints to be kept on the vertical and due to the rigidity of Keystone Mastic Board it eliminates the snaking action which occurs when non rigid flexible ribbon strips are used. The Keystone method also does away with the use of expensive installing machinery. Lower initial cost of material and labor, and the ease of handling are other factors influencing its adoption by contractors throughout the country.

New Highway Program Calls for *Dippers That Can Take It . . . .*

In the vast highway construction program which looms so prominently in postwar plans, the steady *dig, dig, dig* of the power shovel will spell the progress of the numerous jobs. Excessive time out will mean slowing up all down the line. As every road-building contractor knows, delays for repairs mount rapidly into lost dollars.

In power shovel operation, the dipper takes much of the punishment; being subjected to heavy shock loads as well as being in contact with materials which are in many cases severely abrasive.

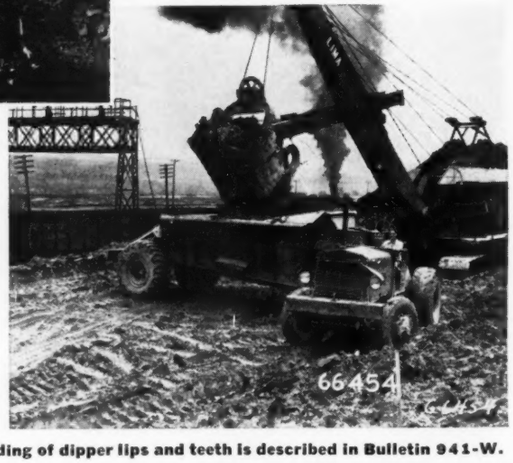
In postwar highway construction, out time for dipper repairs will be considerably less than in the past because an ever-growing proportion of power shovels are equipped with Amsco manganese steel dippers. For over thirty years tough, work-hardening manganese steel has been demonstrating its superiority for withstanding the breakage stresses and grinding wear to which dippers are subjected.

Amsco renewable lip dippers are correctly designed for tomorrow's faster construction tempo—for faster digging and fuller loads. Shovel capacity has been increased by reducing dipper weight while maintaining size, and yet without sacrificing strength, rigidity or long life. The dipper is fast dumping because of a smooth interior, free of obstructions. "U" bolt and interlock fastening speeds up lip replacements. As the dipper is made of "the toughest steel known," the greatest possible wearing life and freedom from breakage are foregone conclusions.

Send for Amsco Dipper Bulletin 641-D.



A-469. Steady production on a Pennsylvania overpass project with a P & H Model 855 shovel equipped with an Amsco renewable lip dipper.



66454. Lima shovel equipped with an Amsco dipper at work on an Eastern highway project. Approximately 900,000 cubic yards of heavy clay and rock were moved in this narrow working area beside the N.Y.C. right-of-way.

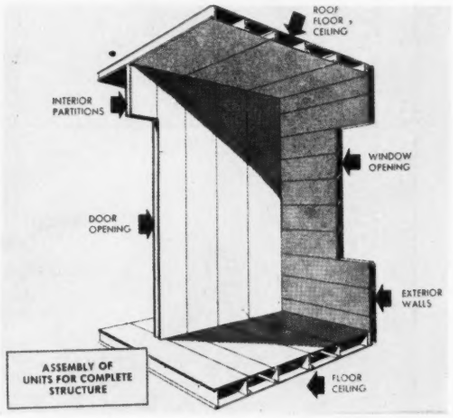
Build-up and hard-surfacing welding of dipper lips and teeth is described in Bulletin 941-W.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

AMERICAN Brake Shoe COMPANY

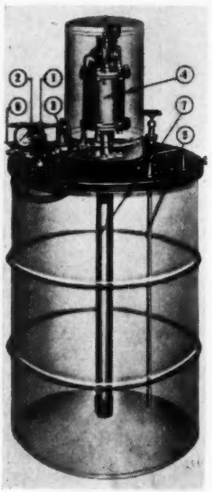
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

METAL BUILDING PANELS for use in sheathing floors, walls, partitions and roofs provide both framing and covering material in single unit. Used for floors, Fenestra building panels will replace joists, rough flooring and also plaster or plaster board ceilings. Installation claimed to be quick, easy and labor-saving. Some types of these units



will be filled at the factory with insulating material to provide sound-proofed walls, partitions, floors or roofs and to assure reduction of heat loss and conservation of fuel. May be used under either wood or concrete floors. Provides long-span roof deck in 20- to 25-ft. lengths. Insulated wall and partition panels can be load-bearing in some types of structures. Advantages: lightweight, permanent construction, rigidity, reduction of settlement problems and resulting plaster cracks and sturdiness and durability that reduce maintenance costs for entire life of building.—**Detroit Steel Products Co., Detroit, Mich.**

★ ★ ★



AIR-OPERATED, HIGH PRESSURE MATERIAL PUMP, designed to dispense and apply paints, lacquer, mastic, sealers, insulating materials, fiber and cement coatings and calking compounds, is available in both stationary and portable models, among them a stationary barrel pump to fit over the top of any standard 54-gal. barrel and recommended especially for the handling of heavy or viscous materials; a stationary barrel pump for handling fluid type materials; and portable "versatal" pump models which come complete with an attached 12-gal. material container. Advantages: (1) Pumps material through several hundred feet of hose; (2) one to six operators may work simultaneously; (3) permits loading without stopping operations and losing productive time; (4) pumps heavy or light consistency materials under extremes of heat or cold; (5) materials handled are constantly circulated and kept well mixed without use of mechanical agitator.—**Alemite Division, Stewart Warner Corp., 1826 Diversey Parkway, Chicago, Ill.**

There's a LINK-BELT SPEEDER FOR *Every Type* OF JOB!



1. Wheel-Mounted Shovel loading out gravel.
2. Crawler-Mounted Trench Hoe, cutting precision sewer trench.
3. Crawler-Mounted Shovel working on Highway Maintenance.
4. Wheel-Mounted Dragline ditching alongside country road.

The Link-Belt Speeder line of crawler or wheel-mounted shovels, cranes or draglines, is available in a wide range of sizes from 3/8 to 3 yards capacity—for gasoline, Diesel or electric motor operation. Fully convertible to all conventional front end attachments without change in the machine proper. Especially suited to a wide variety of uses in the fields of construction, logging, foundries, scrap yards, gold mining, coal stripping, and to all industry in general, for the moving and handling of materials. 9875-A

For Prompt, Efficient, Convenient Sales and Service There is a Link-Belt Speeder Distributor Located Near You.

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

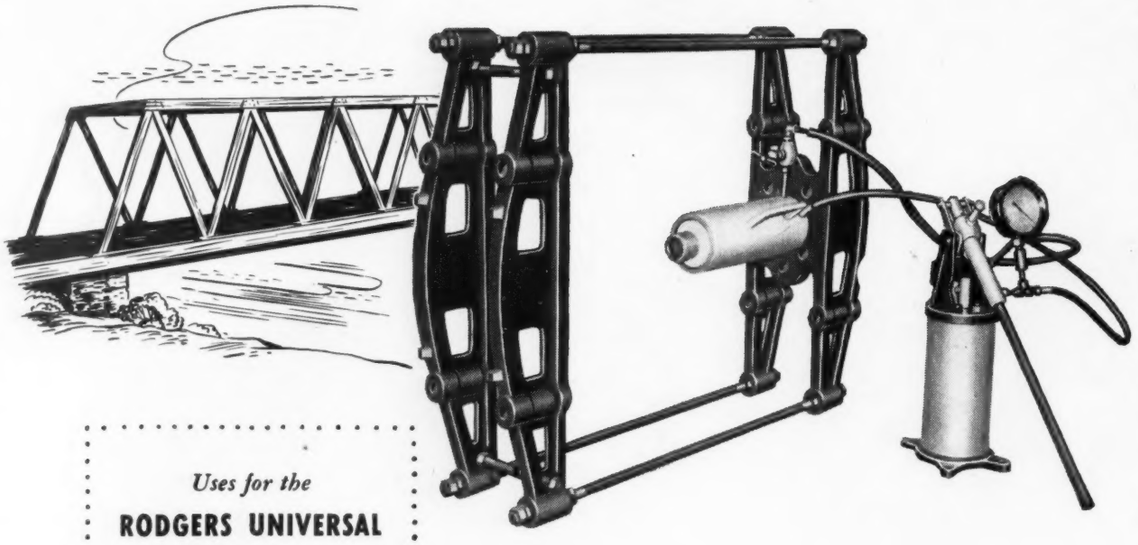
LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

NO. 20 OF A "READY-WITH-A-RODGERS" SERIES



"We took a bridge apart with our RODGERS UNIVERSAL PRESS"

. . . states the superintendent of a construction firm.



Uses for the

RODGERS UNIVERSAL HYDRAULIC PRESS

- Gear Pulling
- Wheel Press Work
- Jacking Pipe
- Erecting Machinery
- Relocating Machinery
- All-Purpose Jack

THE PROBLEM... removing hinge pins on an old truss bridge.

"On one job alone, dismantling an old truss bridge, our Rodgers Universal Press paid for itself several times over. It enabled us to push out the hinge pins quickly and easily, effecting a tremendous saving in time, labor and material.

"In another instance we used our Rodgers Universal Press with a spread footer to push a concrete wall into proper alignment. That's adaptability—we originally bought this portable press equipment for overhauling and repairing our shovels and crawler-type tracks."

You can use the Rodgers Universal Hydraulic Press in any place or any position where pulling, pressing, or lifting power is needed. When emergencies arise, be ready with a Rodgers!

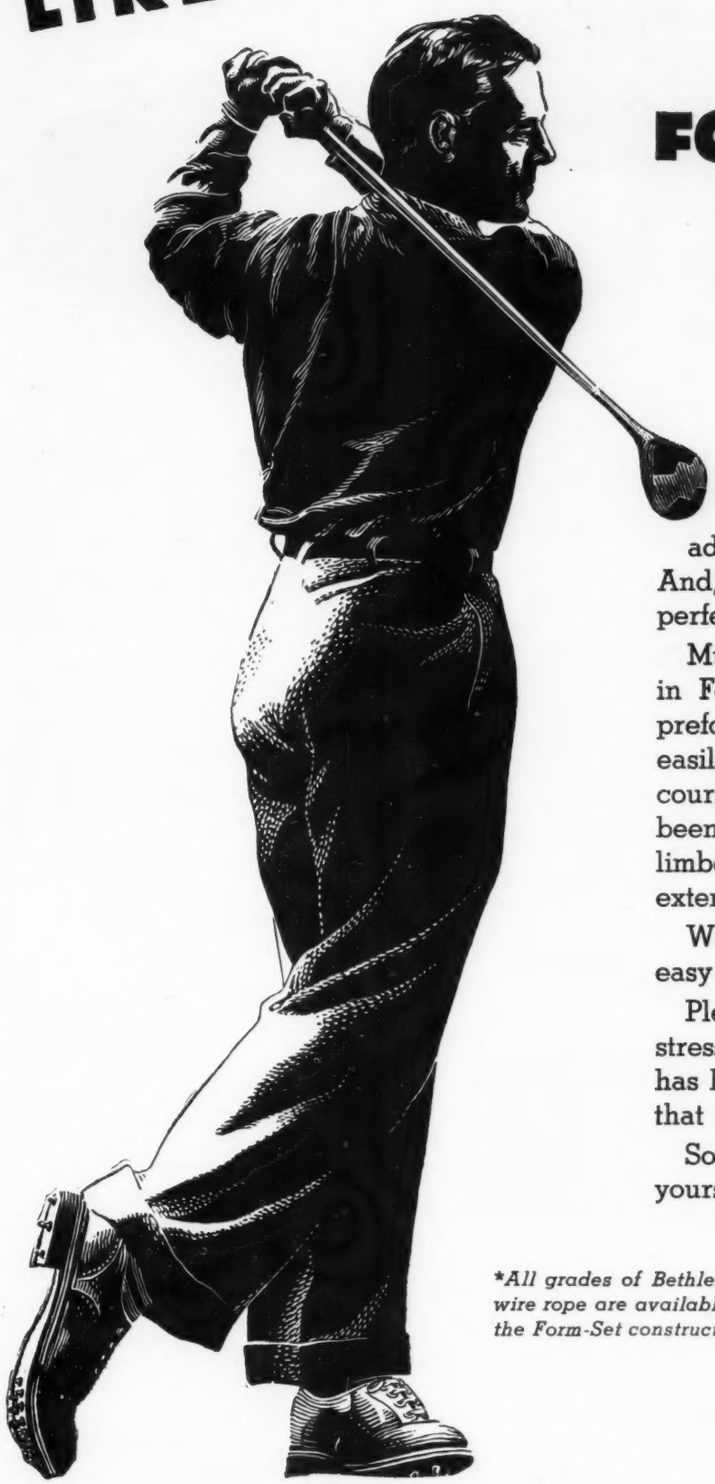
If it's a Rodgers, it's the best in Hydraulics.

4 SIZES—*one for your job . . . write today for full information!*

RODGERS HYDRAULIC, INC.

7403 Walker Street, St. Louis Park, Minneapolis 16, Minnesota.

LIKE A TOP-FLIGHT GOLFER



FORM-SET ROPE IS *Relaxed*

When the champion rifles his drive down the fairway, the gallery murmurs admiringly, "Doesn't he make it look easy!" And, for him, it *is* easy. Timing perfect, swing perfect. The secret is *relaxation.*

Much of that same relaxed effect is present in Form-Set rope. Form-Set is Bethlehem's preformed rope, and it spools easily, handles easily—every last foot of it. The reason, of course, is that a preformed wire rope has been relieved of many internal stresses; it's limber, bendable, supple. It doesn't require extensive breaking-in.

Well, you ask, what do I get besides this easy handling? Anything else?

Plenty—when it's a Form-Set rope. With stresses, strains, and tension reduced, a rope has high resistance to bending fatigue—and that means longer life, fewer replacements.

Sounds pretty logical, doesn't it? See for yourself with a reel of *relaxed* Form-Set*.

**All grades of Bethlehem wire rope are available in the Form-Set construction.*



When you think WIRE ROPE . . . think BETHLEHEM



After 40 thousand miles of operation, one hauling contractor reports the following savings made possible by the HYDROTARDER controlling the speed of trucks on downgrades.

25% SAVING IN TIRES

8% SAVING IN FUEL

85% SAVING IN FRICTION BRAKES

15% SAVING IN TIME

It will pay you to install HYDROTARDER on your trucks, because HYDROTARDER more than pays for itself by these savings.

Parkersburg HYDROTARDER

Distributed by

HETZEL BROTHERS
Engineers and Manufacturers
1972 Los Angeles Street, Los Angeles 11, California

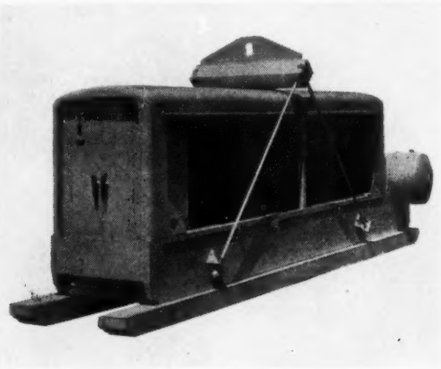
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THE WINTER-WEISS COMPANY
22nd and Blake Sts., Denver 2, Colorado

●

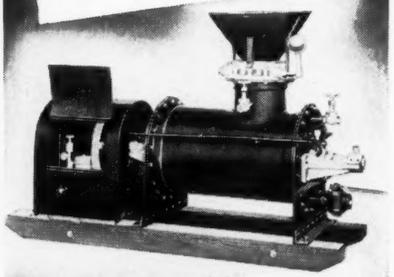
THE POINTER-WILLAMETTE COMPANY
238 N. E. Oregon St., Portland 14, Oregon

ELECTRIC-DRIVEN, SKID-MOUNTED COMPRESSOR, built especially for U. S. Navy, is claimed to be unusually portable, a center balance baling hook making problem of loading and handling between ship and shore an easy one. Hook can be quickly attached to loading cable and compressor swung into action thereby delivering air power without



delay. Unit delivers 315 cu. ft. per min. at 100-lb. pressure at motor speeds below 900 rpm. and may be adjusted to operate at pressures from 40 to 125 lb. Powered by 75 hp., 3-phase, 60-cycle, 220/440-v. Westinghouse motor. Compressor, electric motor, controls, gages, tools and accessories are all under on hood, mounted to afford easy access during operations. Hood panels are designed to slide into place when unit is not in operation.—**Davey Compressor Co., Kent, Ohio.**

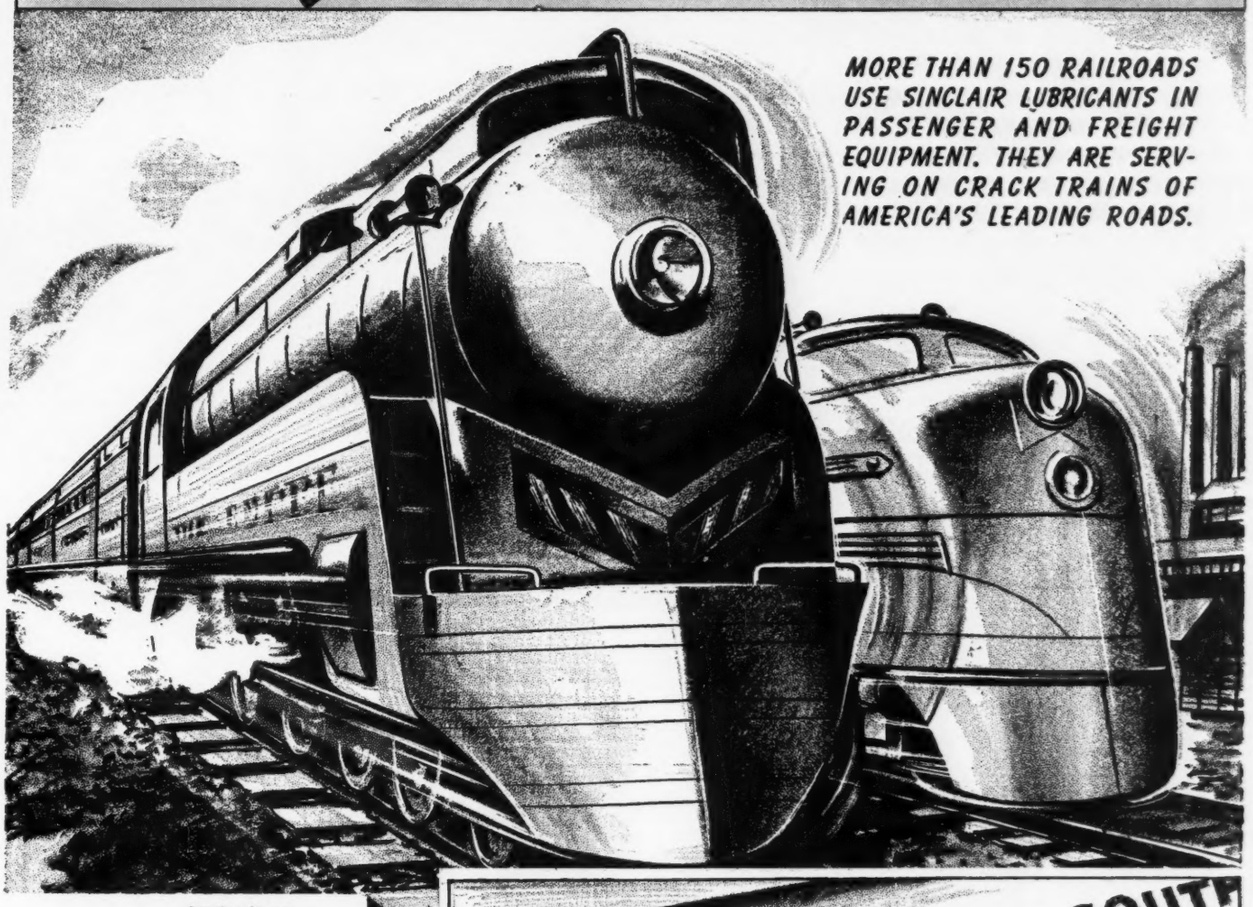
For Grouting use a UNION!



The Union Grout Mixer and Ejector does a thorough job, whether for roadbed stabilization or any other type of grouting requirements. *Send for bulletin No. 195.*

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CHICAGO AND SOUTHERN AIR LINES WHICH HAS INAUGURATED AN ADDITIONAL DETROIT-HOUSTON-NEW ORLEANS DAILY SERVICE WITH NINE INTER-CITY SCHEDULED STOPS HAS FLOWN ITS FLEET OF DIXIELINERS MORE THAN 18,600,000 REVENUE MILES ON SINCLAIR PENNSYLVANIA MOTOR OIL.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

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HOLES

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DIG THEM QUICKLY AND EASILY WITH A BUDA EARTH DRILL

Digging holes by hand is a slow process—speed up deep or shallow hole drilling with a dependable BUDA Earth Drill.

Write or wire for literature.



BUDA Model 2215-SB "All-Purpose" Automatic Lowering Jack. 15 ton capacity.

BUDA Model No. 5010 Ball Bearing Mechanical Jack. 50 ton capacity.



ARMY NAVY

BUDA

15425 Commercial Ave. **Harvey (Chicago Suburb) Illinois**



DUAL CASE for carrying welding electrodes and weld cleaning tools is two-purpose container designed to carry a supply of electrodes suspended from operator's belt and to provide space for his cleaning tool. Use of this case prevents scrapping of electrodes due to cracked and chipped flux coating caused by strewing them on the floor. Of heavy harness leather construction, case is riveted for permanence and is provided with a broad loop for attachment to welder's belt. Capacity 8 to 10 lb. of electrodes. Height of case, 12 in.; diameter, 3½ in.—**Atlas Welding Accessories Co., 14824 Wyoming Ave., Detroit, Mich.**

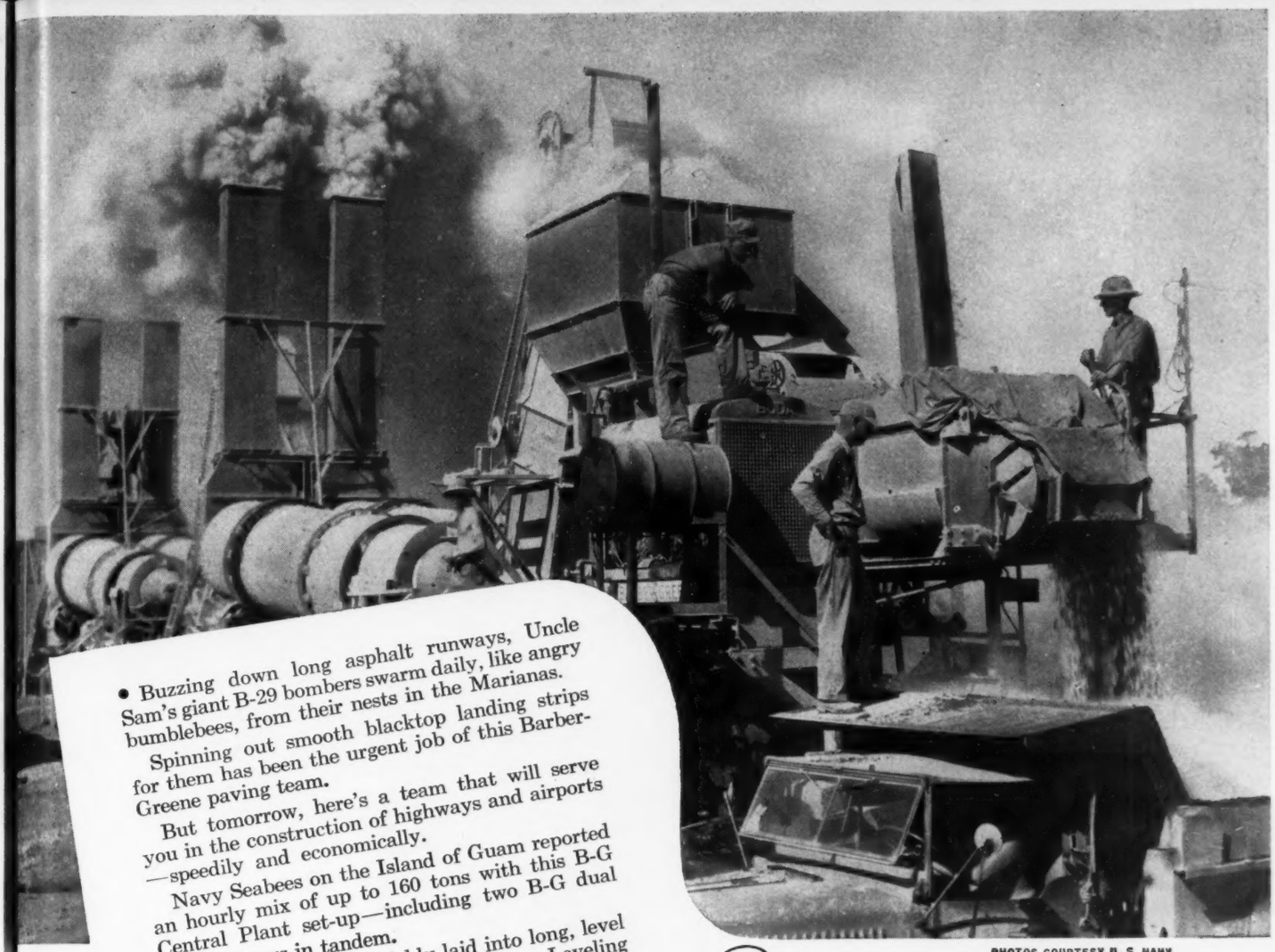
★ ★ ★

ACOUSTICAL CEMENT, known as Dolphinite No. 2360, fastens acoustic blocks to plaster, cement or metal ceilings without the use of mechanical fasteners. Provides unusually strong bond, withstands customary tapping and adjusting of blocks and does not require shoring. Heavy-bodied and practically non-drying, it contains long fibers, is waterproof and unaffected by change of temperature.—**The Dolphin Paint & Varnish Co., 922 Champlain St., Toledo 3, Ohio.**

★ ★ ★



RECHARGEABLE WET FLASHLIGHT BATTERY is said to be especially valuable for operations where long continued and steady usage of flashlights is necessary. Company claims that wet storage batteries are more economical than dry cells when flashlight service is required in volume or where batteries require replacements once every two weeks. Batteries give same light as industrial type dry cells. Freshly charged wet battery will give about 3 hr. of constant light. Another advantage is ease of control of wet batteries among employes through use of number identification tags on each battery requiring return of old battery for new one when it is necessary to recharge. New battery requires special type Mazda lamp which comes in 1.9 v., .6 amp. of screw base and flange base design. This is a 600-mil lamp as contrasted with the 300-mil lamp used with dry batteries. Actual wattage consumed with wet battery is 50 per cent more than with dry type. Light is constant since voltage drop between full charged and discharged wet cell battery is only .35 v., dry cell drops approximately a volt. This assures constant top quality light at all time the wet cell is being operated —**The B. F. Goodrich Co., Akron, Ohio.**



PHOTOS COURTESY U. S. NAVY

THE B G TEAM THAT BUILT A "B's" NEST

• Buzzing down long asphalt runways, Uncle Sam's giant B-29 bombers swarm daily, like angry bumblebees, from their nests in the Marianas.

Spinning out smooth blacktop landing strips for them has been the urgent job of this Barber-Greene paving team.

But tomorrow, here's a team that will serve you in the construction of highways and airports —speedily and economically.

Navy Seabees on the Island of Guam reported an hourly mix of up to 160 tons with this B-G Central Plant set-up—including two B-G dual Drum Dryers in tandem.

Mix produced was quickly laid into long, level taxiways with a modern B-G Tamping-Leveling Finisher.

When the time comes to begin the extensive highway and airport program, let Barber-Greene equipment help you. B-G equipment has established new standards in accuracy of proportioning and homogeneity of mix . . . has provided a method of putting down a firm, ripple-free mat efficiently. Moving and erection has been changed from a major project to a simple, low-cost maneuver. Barber-Greene Company, Aurora, Illinois.

45-6

Barber B G Greene

Constant Flow Equipment





You Don't Need a Sledge Hammer *to drive a carpet tack*

It isn't all force in driving a nail. Blasting is that way, too.

Figuratively speaking, explosives can deliver the heavy blow of a sledge hammer, or the light tap of a tack hammer. Blasting results depend on both the type of explosive and its use.

To enable you to pick the right explosive*, Atlas has more than one hundred twenty kinds and grades. Some of these give good results under a variety of conditions—but, we think there is one right kind and grade of explosive for each job.

ATLAS GELODYNS*

For example, examine the qualifications of Atlas Gelodyns. They combine some of the advantages of high count ammonia dynamites with some of the advantages of gelatin types. Gelodyns are sufficiently plastic to be retained in upward pitching bore holes. They are more moisture resistant than ammonia dynamites. They cost less per cartridge than gelatins of equivalent strength, and can frequently be substituted on a cartridge-for-cartridge basis. This affords attractive economies in highway and general construction blasting.

Atlas representatives can help you pick the right explosive. They have a specialized knowledge of explosives, which, when combined with your mastery of your own operation, can stretch equipment, save man power and cut job costs. Talk it over when the Atlas man calls.

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe. 1½" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 5% MORE)						
				1⅛"	1¼"	1½"	1¾"	2"	4"	5"
Gelodyn No. 1	65	10000	14000	129	107	73	55	42	11	7
Gelodyn No. 3	65	11000	15000	146	120	82	61	47	13	8

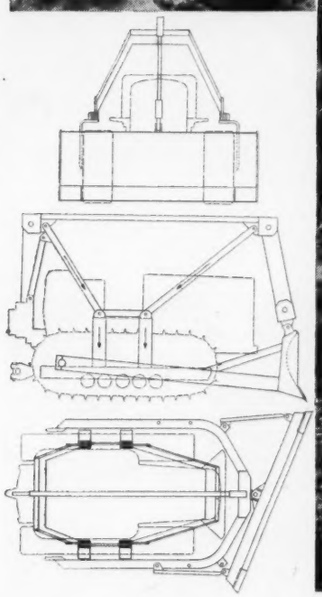
Gelodyn: Reg. U. S. Pat. Off.

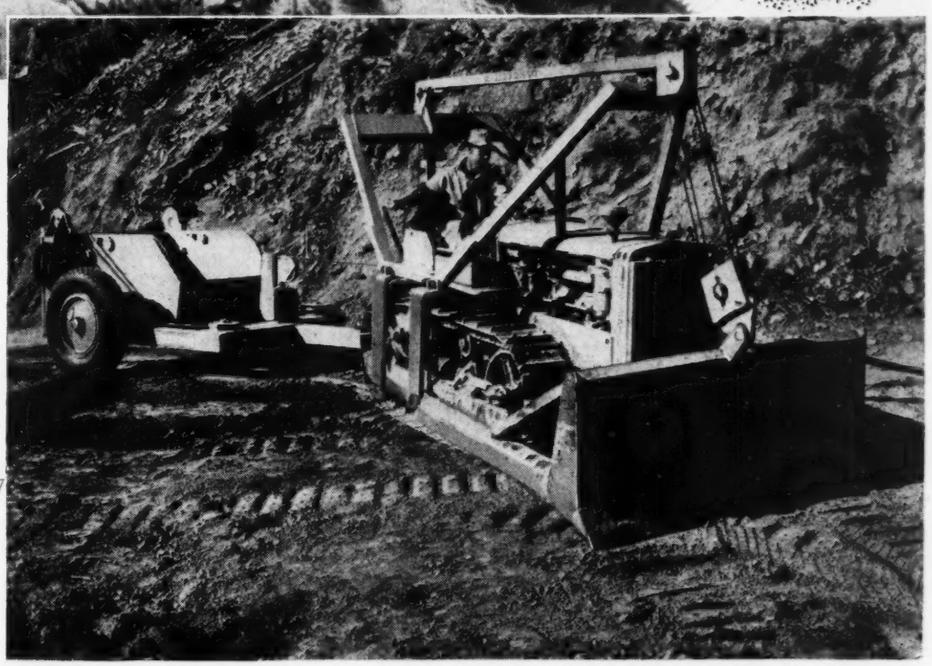
ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*







ANY WAY YOU LOOK AT IT . . . front, side or top . . . it's the slickest thing on two tracks. The "A Frames" and TWO "Over Center Track Mounted" brackets distribute the load evenly over the entire track frame, utilizing maximum tractive effort. No twisting, teeter-totter, action here.

MANY ADVANTAGES are also offered by Southwest Single Cable Controlled Rear Dump Hauling Scoops. Combination dozer-scoop hook-ups like the one pictured above are very popular—especially when both can be operated from one double drum Power Control Unit. Write for complete literature.

REMEMBER TOO, Southwest builds for all four makes of track-type tractors.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



WINCHES BULLDOZERS CRANES TANKS DUMP WAGONS RIPPERS TAMPERS SCRAPERS

PARSONS
250 TRENCHLINER



BOOM EASIER TO SHIFT FROM SIDE TO SIDE

. . . because it rides on rollers



Wide rollers support the telescoping boom, make it easier to shift from side to side.

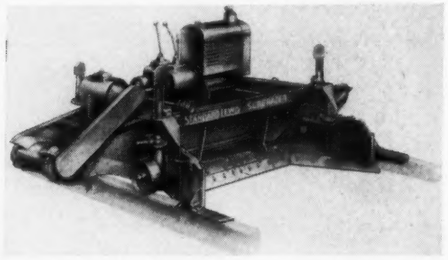
Shifting the boom for trenching in close quarters, for digging close to trees, poles or curbing lines, in narrow alleys or on road shoulders, costs less with the Parsons 250 Trenchliner because the 250 boom is easy to shift. Riding on two wide rollers, the boom rolls smoothly and easily from side to side across the full width of the boom carriage when anchor bolts are removed. Parsons trenchers alone have these patented transverse boom shifting rollers.

THE PARSONS COMPANY

KOEHRING SUBSIDIARY **NEWTON, IOWA**

TRENCHING EQUIPMENT PARSONS

SUBGRADER, designed to meet contractors' demands for lower subgrading costs and engineers' exacting requirements for finished subgrade, has sectional stationary cutting blade (adjustable to any desired subgrade contour) on each side so that grading may be done in either direction without turning machine or time consuming "pull-backs." May be raised by power to pass over manholes, culverts and other obstructions while in operation. Wheels may be turned 90 deg. to

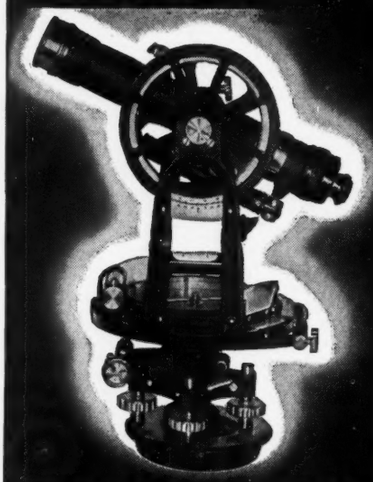


permit towing by truck or tractor over bridges or through narrow places. Entire end of subgrader can be quickly removed to clear obstacles such as curbs, trees, walls and poles within 12 in. from pavement line. Use of solid rubber tired wheels for traction on pavement prevents chipping or breaking edges. Edging attachment permits grading right up to side forms, thus eliminating handwork. Powered by 4-cylinder gasoline engine, 3¾x4-in. bore and stroke, developing 28 hp. at 1,200 rpm. Maximum cutting depth, 18 in. Cutting width, variable from 6 to 30 ft.—**Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 11, Calif.**

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are doing an outstanding job throughout the World



TYPE II U. S. ARMY TRANSIT

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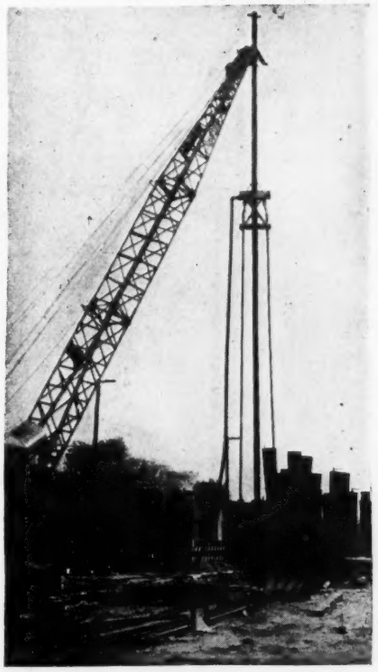
Recommended for precise Municipal, Railroad, Highway and Bridge Work.

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Griffin High Pressure Jetting



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Jetting steel piles with two jet pipes and Special rig for accurate location.



WOOD
Wood pile clusters along new boardwalk at Coney Island. Single jet used.

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OR
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ANY TYPE OF
PILE FOUNDATION
with the
GRIFFIN SYSTEM

We can supply you with a single Jetting Pump—or a multiple high pressure pumping system, complete with Heavy Duty Jetting Hose, Nozzles, U bends, extra heavy Jet Pipes and Manifolds. You can rent or buy these pumps completely equipped and ready for work. With such Griffin Equipment you can save time, eliminate trouble, whether you want to put piles (or complete pile bents) in—or take them out. All the data you want on this type of work is available in our Catalog. A copy will be sent on request, and questions regarding any particular problem promptly answered.



CONCRETE
Concrete Piles with two jet pipes for 25' penetration through sand and clay.



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GRIFFIN WELLPOINT CORPORATION



Weight in the Right Places

The Insley Excavator is designed with weight in the right places for fast, *balanced* action . . . for time saving swings . . . for one-bite digging. Every pound does double duty as stabilizing counterweight or anchor. The engine is mounted on a low turntable, well back from the center of rotation. Dead weight is eliminated from the construction of the boom . . . and from all other parts . . . assuring balanced weight for faster action.

You'll like these features of design and construction because—*like every Insley feature*—they contribute to lower cost yardage. For your new equipment—when we can again supply it—choose an Insley ⅜ or ½-yd. Excavator . . . five easily interchangeable attachments—shovel, crane, hoe, clamshell, and dragline.



INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

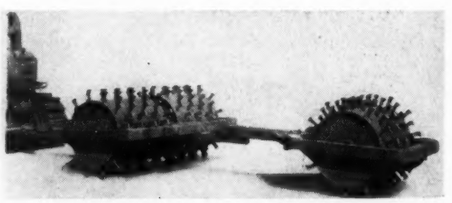
25-LB. HEAVY-DUTY FIRE EXTINGUISHER that is moved and operated with uninterrupted single-sweep action features palm-trigger valve mounted on its steel handle. Operator by grasping handle can move unit and press release button with one hand, discharging a penetrating, icy blanket of carbon dioxide in a sweeping arc, 10 to 20 ft. Release of pressure on palm-trigger automatically



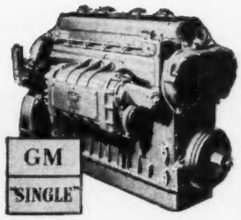
stops flow of carbon dioxide gas, eliminates twisting of valves and retains remainder of charge for repeated attacks. This simplified operation saves precious seconds and greatly reduces chances of "operator's panic." Horn-and-hose connection 5¾ ft. long directs an accurate, full charge into base of flames, keeping operator at a safe distance from heat. Mounted on hard-rubber wheels, unit is self-balanced when standing or in operation. Especially recommended for protection against gasoline, paint, oil, grease, machine electric or surface fires in shops, shipyards, refineries, garages and airports.—**Randolph Laboratories, 8 E. Kinzie St., Chicago, Ill.**

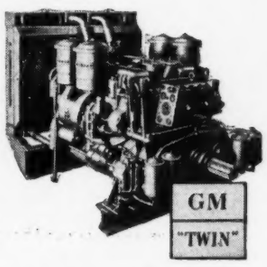
★ ★ ★

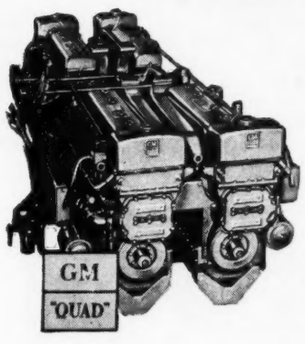
SHEEPSFOOT TAMPING ROLLERS for use with Allis-Chalmers crawler tractors has following features: Heavily reinforced box-type welded steel frame; rollers that turn on axles which pass through lubricant-retaining tubes so that weighing fluids cannot come in contact with axles; self

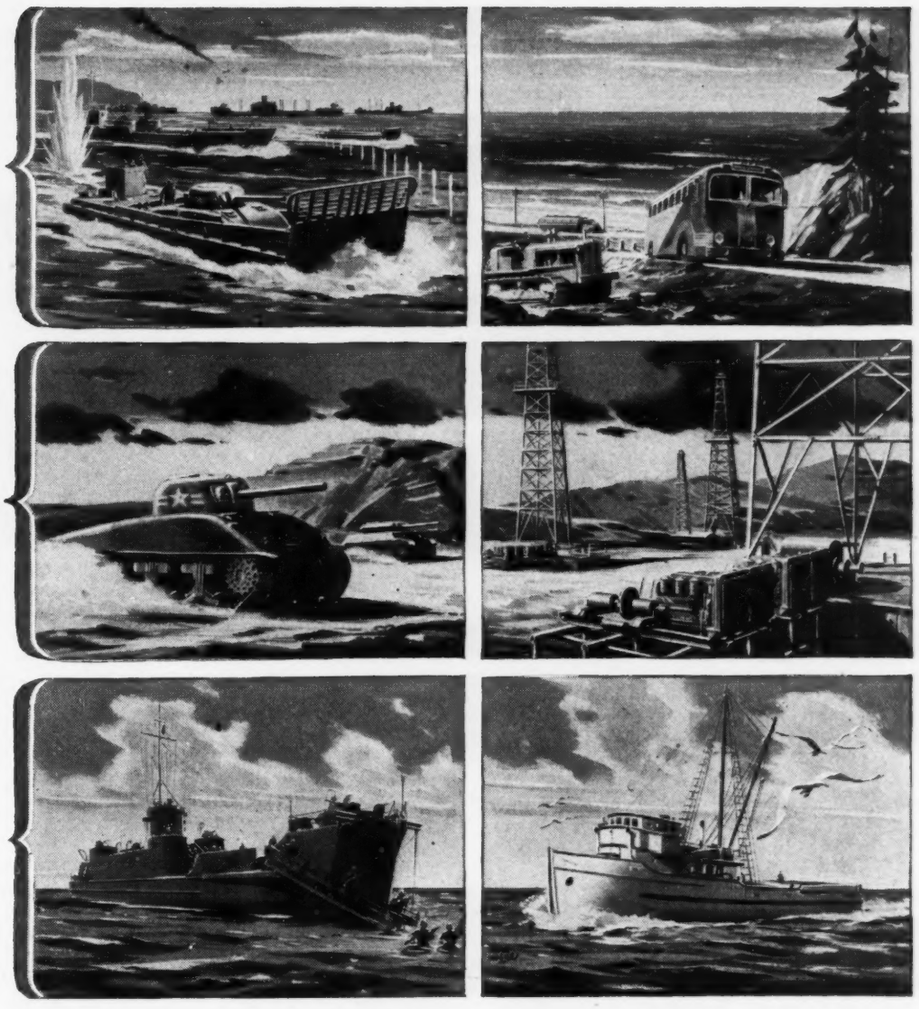


aligning roller bearings on each side of roller; forged tampers with readily renewable heads to minimize tearing up of compacted material; shear type tamper cleaners, front and rear, and spring-cushioned drawbar. Removable tongue. Clevis on rear tiebar permits use of rolls in tandem. Available in single, double and triple roll units.—**Baker Manufacturing Co., 501 Stanford Ave., Springfield, Ill.**









"SINGLE", "TWIN" OR "QUAD"

This is the story of how one basic engine, a favorite everywhere it runs, has become a winner even in applications which demand two to four times its power.

The engine is the General Motors series 71 Diesel which, back in peaceful days, showed the world what dependable low-cost Diesel power could do on farms, highways and on scores of construction projects where developments in progress were quick to recognize the advantages of packing more power into less weight and space.

It's busy now all over the world powering landing craft and machinery that is building landing strips and leveling jungles.

Where double the power is needed and space is cramped, two engines are joined side by side. Such "Twins" are used in M-3 and M-4 tanks and M-10 destroyers.

In its third form, two "Twins" are joined end to end, forming a "Quad." It is two of these "Quads" that drive the twin screws of the famous LCI's (landing craft infantry), fastest of all landing craft.

But whether "Single," "Twin" or "Quad" these GM series 71 engines are promising many advantages for power users on big jobs and little. With a range of horsepower to fit almost every need, the GM Diesel will be a good bet for everyone who wants dependable power at low cost.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

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DIESEL POWER

ENGINES . . 15 to 250 H. P. . . **DETROIT DIESEL ENGINE DIVISION,** Detroit 23, Mich.

ENGINES . . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . . , ELECTRO-MOTIVE DIVISION, La Grange, Ill.

Only HERCULES Delivers All These Features



Bigger payloads unloaded faster—less maintenance—greater profits—these are the advantages of Hercules construction . . . advantages that make Hercules dump bodies worth waiting for!

While you're waiting, your Hercules distributor can be of service, keeping your present equipment in top working order. He has the mechanical facilities, the replacement parts and the trained personnel needed to maintain your overworked equipment.

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DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

Buy War Bonds . . Invest in America's Future and Your Own

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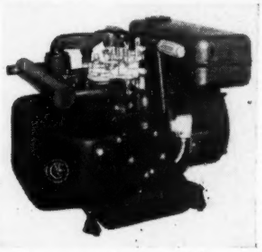
COMPLETE LINE OF AIR COMPRESSORS in both portable and stationary models and in capacities ranging from 60 to 500 cu. ft. are being manufactured by engine builders' precision methods assuring the following advantages for post-war uses: (1) Permits full-rated output of air with 20 to 30 percent lower piston speed; (2) simplified control of heat and condensation through use of Swedish



twin valves eliminates danger of overheated tools and pressure losses caused by sharp drops in temperature in long air lines; (3) condensation and oil vapor controlled by automatically unloading and draining corrosive fluid from intercooler system during each idling period. (4) Compact "W" arrangement of compresseor cylinders permits use of short crankshaft and closely spaced main bearings and also provides easy access to valves and parts. (5) Valves and pistons interchangeable throughout. Gas diesel or electric powered models available with direct or belt drive.—**Jaeger Machine Co., Columbus, Ohio.**

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350 to 35,000 WATTS - AC or DC



Reliable, practical and low cost. Available in all sizes. Portable, self-contained, inherently regulated generator. Write for details

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WATERLOO, IOWA

MIXERS • PUMPS • HOISTS
BATCHING & PLACING EQUIP.
SAWS • CARTS • BARROWS

This RUST Prevention Program may save you $10,000 too!

Manufacturer salvages 12,000 Ballistic Dies . . . protects further production with ANTI-CORRODE

A complete plant rust-prevention program is certain to insure operating economy and accelerate production. Backed by a complete line of tested Anti-Corrodes for every industry, Cities Service engineers are prepared to study *your* rust problems and recommend a specific plan to eliminate them.

Here's an Example . . .

A Bloomfield, N. J., manufacturer of ballistic dies had a costly problem. After partial completion, his dies were boxed, then shipped to another plant for final treatment. The dies invariably rusted so badly during return transit that they actually would stick together. 12,000 in this condition had accumulated in the plant, representing an investment *in labor alone* of eight to ten thousand dollars.

Cities Service engineers were called in. They supplied a product to clean the defective dies quickly . . . specified a special grade of Cities Service Anti-Corrode to protect them in storage. Three months later the dies were accepted for completion by the final processor. All dies thereafter were immediately dipped in this Anti-Corrode. The rust problem was licked.

Performance records such as this are being chalked up every day by Cities Service engineers in every industry — Mining, Textile, Metal-Working, Construction and others.

See what Cities Service can do for you. Call in our engineers now. Contact your local Cities Service office or mail this coupon.



ANNUAL RUST TOLL CONSERVATIVELY ESTIMATED AT $100,000,000 . . . All metals when exposed to the elements have an inherent tendency to revert to one or another of the forms in which they were originally found in the earth. Iron rust is the most common example of this action. Best safeguard for *your* equipment is a carefully planned and followed Rust-Prevention program.

ANTI-CORRODE safeguard for Industry

CITIES SERVICE OILS — ONCE-ALWAYS — YOUR SYMBOL OF SERVICE

Cities Service Oil Company
Room 331, 70 Pine Street, New York 5, N. Y.

Gentlemen: Please have your engineers discuss with me a program of rust-prevention for our plant. (No obligation, of course.)

Name.....

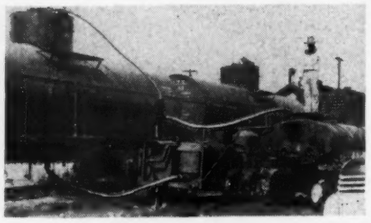
Title..... Company.....

Address.....

City..... State.....

SWEEPERS *and* HEATERS TO DO *Your* JOB *Right!*

The WAR ISN'T OVER! But now is the time to be prepared for the BIG job ahead when final victory is ours. Grace HAS what it takes to do YOUR JOB RIGHT! Send for details of the Grace Rapid Fire Circulating and Steam Heater for tank cars of asphalt. Grace Heaters reach and maintain desired temperatures quickly and efficiently, whether contents of car are liquid or solid.



The GRACE 2-Way Axle Driven Sweeper



Here is the Grace Sweeper . . . available in Motor Driven, Axle Driven or Tractor attachment types . . . all with long-life bristles . . . easily adjustable. Send for full information on Grace Sweepers, Drag Brooms, Sheepsfoot and Pneumatic Rollers, and Garbage Collection Bodies.

W. E. GRACE MANUFACTURING CO.

6005 S. LAMAR STREET **DALLAS, TEXAS**



MODEL 23 ILLUSTRATED
IMMEDIATE DELIVERY ON ALL MODELS

10 REASONS WHY MASTER VIBRATORS PLACE CONCRETE FASTER..BETTER ON ANY JOB!

Master Gas or Electric High Speed Concrete Vibrators are built for high frequency vibration and maintain constant speed under full load to make possible: (1) low cost, high strength concrete; (2) better bond to steel or successive layers; (3) greater density and uniformity; (4) reduced shrinkage and cracking; (5) minimum absorption, greater water tightness; (6) improved compression and flexural strength; (7) drier and leaner mixtures; (8) earlier removal of forms; (9) placing in difficult positions and elimination of hand tamping and spading; (10) minimum finishing and patching, etc.

WRITE TODAY FOR COMPLETE DETAILS

There are Medium Duty, All Purpose or Heavy Duty Master High Frequency Constant Speed Vibrators in Gas or Electric Models to meet every need . . . together with a complete line of Concrete Surfacing Attachments and High Speed Tools.

Write for Bulletin No. 528.

ACCEPTED AS STANDARD EQUIPMENT BY CONTRACTORS & ENGINEERS THROUGHOUT THE WORLD

Master High Frequency Constant Speed Concrete Vibrators are no experiment. *They have been proved on every type of construction job for many years. Even under the most adverse operating conditions they provide constant operation over long periods of time.*

MASTER VIBRATOR COMPANY DAYTON 1, OHIO

Distributors throughout United States, Canada and other countries

Products Include: Portable Gas-Electric Generator Plants, 500 watts to 17,000 watts, Voltage Regulators and Portable Mountings Optional • Master Flood and Shovel Lights • Concrete Vibrators (Gas or Electric) High Speed Tools and Concrete Surfacing Attachments • Big 3—Generators and Tool Equipment • Concrete Vibratory Finishing Screeds • Concrete Troweling Machines (Gas or Electric) • Electric Hammer and Spade, Hammer Tools • Pavement Breaker and Tie Tamper • Back-Fill Tamper and Tie Tamper • Grinding Machines and Tools • Electric Hoist (Export Only).

NEW GLASS, which successfully survives exposure to corrosive hydrofluoric acid that disintegrates ordinary glass, corrodes most metals and produces dangerous burns, is expected to simplify the handling of this acid which now is extensively used in scientific experimentation and as a catalyst in oil refining and synthetic rubber manufacture. As its melting and working properties are about the same as ordinary glass, it can be manufactured in a regular glass factory, can be cast or drawn into sheets or blown into bottles and other shapes, can be ground and polished, tempered and subjected to other processes involved in glass technology without requiring special equipment or technique. Potential uses of this glass are in the fabrication of test tubes, beakers, bottles, evaporating dishes and other containers; window panes for laboratories and factories where acids are employed; lenses for safety goggles and helmets; and glass gages to observe and check the action of acids in metal cylinders and reaction vessels. **—American Optical Co., Southbridge, Mass.**



LENS ATTACKED BY ACID FUMES and is opaque is pointed out by Dr. Alexis G. Pincus, scientist who developed new glass. Lens made of new glass is still transparent and can be seen through, as shown by face behind lens.

★ ★ ★

MOUNTING SYNTHETIC INNER TUBES requires different treatment from that used in mounting those of natural rubber, a fact which led to the introduction of a new Amalie B.G. compound to be used in this operation. New lubricant is a compound of medium soft consistency made of pure vegetable oils and does not contain ingredients that are injurious or cause deterioration of synthetic or natural rubber. Tire dealers and repair depots are cautioned by the makers of this compound against the use of oil, grease or ordinary soap solutions which are detrimental to synthetic rubber and warned that only when tube and flap are properly lubricated and mounted can premature failure of synthetic tubes due to faulty mounting be avoided. Detailed information and step-by-step directions for use of this compound available to those interested.—**Amalie Div., I. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.**



"NO TRAFFIC JAM WITH THAT SKIP!"

"That Rex skip really keeps us moving right ahead because it gives us those extra few seconds of loading time that mean more batches per hour," says a well-known paving contractor.

Why, it's practically a "one-man ground crew" that kicks the batch into the drum almost faster than you can say "Jack Robinson." Then—zingo—the skip is back on the ground again and it stays there just long enough to give the exact time needed for dumping the next batch into the skip.

The operator is *not* required to turn the water on or off manually, he can drop the skip *faster* . . . permit it to remain on the ground those few seconds longer that mean more orderly loading, more yards per day.

And it's all made possible by the famous Rex Mechanical Man that automatically controls the batch transfer and entire mixing cycle right to a split second. It opens and closes the discharge door—it opens and closes the transfer door—it controls the water and it starts the skip upward—all in perfect timing and with valuable seconds saved.

RELY ON YOUR Rex Distributor. *He handles the complete line of Rex equipment for speeding up the mixing, hauling and placing of concrete and the moving of water. See him for Pumps, Mixers, Pavers, Moto-Mixers and Pumpcretes. You'll find him always ready and willing to help you locate new and used equipment, and to help you keep your present equipment in top running order.*

CHAIN BELT COMPANY of *MILWAUKEE*

REX

CONSTRUCTION MACHINERY



PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

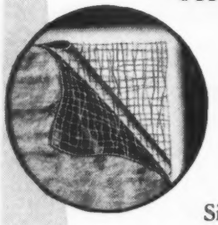
Put This at the Top of Your Immediate "Check List"

Investigate... how Sisalkraft insures positive curing at Low Cost

Time Tested... Field Tested

SISALKRAFT

Cures and Protects



Sisal fibre reenforcement for strength — special asphalt for water-proofness — kraft paper treated to make it scuff-proof— sealed by heat and pressure to produce Sisalkraft.

Sixteen years of experience has established that Sisalkraft is "tops" as a concrete curing and protective agent. Once in place, curing is automatic . . . no sprinkling . . . no watching . . . no human element. Equally important, Sisalkraft can take plenty of abuse without scuffing, protects against drippings and debris, thus assuring a clean, hard, smooth, dense surface that makes grinding of floors unnecessary.

MANY USES CUT JOB COSTS

Use Sisalkraft to cover and protect equipment against weather . . . line construction shanties . . . cover stock piles . . . for closing in . . . over sub-fills . . . over sand cushions under tarrazzo . . . to cover brick courses . . . as all-'round building protection.

War production has restricted immediate availability — but after the war, as before, the Sisalkraft dealer organization will be ready to serve you in 48 states.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY
In Canada Write to Alexander Murray & Co., Limited, at Montreal · Toronto · Halifax · Saint John · Winnipeg · Vancouver

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X SISALTAPE AND COPPER-ARMORED SISALKRAFT

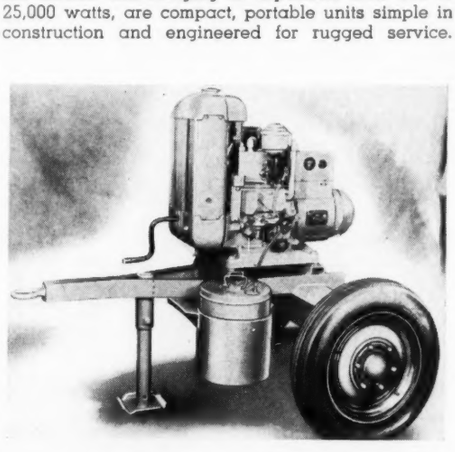
GROUND RESISTANCE TESTER, known as Model 255 Vibroground, is said not only to give accurate readings for all ground conditions, but also to be particularly adapted to operation in arid or wet regions or where extreme dryness or moisture are found. Unit has four ranges, 0-3, 0-30,



0-300 and 0-03000 ohms. With its direct readings no calculations are necessary. Reverse readings are unnecessary and polarization errors cannot occur. Design also excludes strays from high potential networks, dc. ground currents, or any ac. commercial frequencies and other sources encountered in plant or field. It is claimed that a complete test, including setting test rods can be made in less time than by any other means. One-piece welded case is watertight, assuring accurate readings even on sodden ground. Light and easily portable.—**Associated Research, Inc., 231 S. Green St., Chicago 7, Ill.**

★ ★ ★

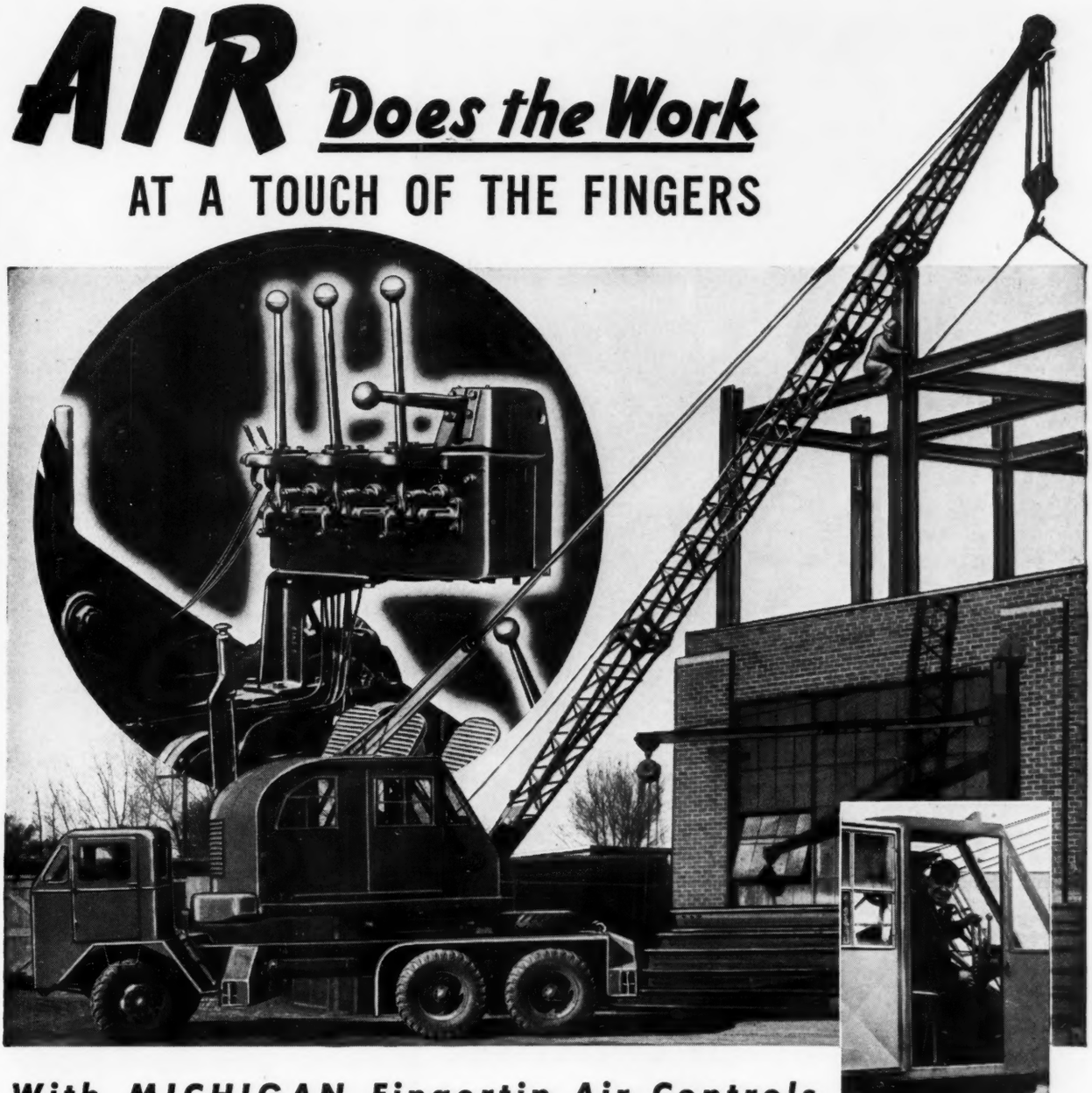
ELECTRIC GENERATING SETS in 65 basic ac. and dc. models and ranging in capacities from 350 to 25,000 watts, are compact, portable units simple in construction and engineered for rugged service.



These plants supply dependable electric power, according to their manufacturer, comparable to that provided by city power companies for use wherever electricity is not available.—**The Construction Machinery Co., Waterloo, Iowa.**

AIR Does the Work

AT A TOUCH OF THE FINGERS



With MICHIGAN Fingertip Air Controls

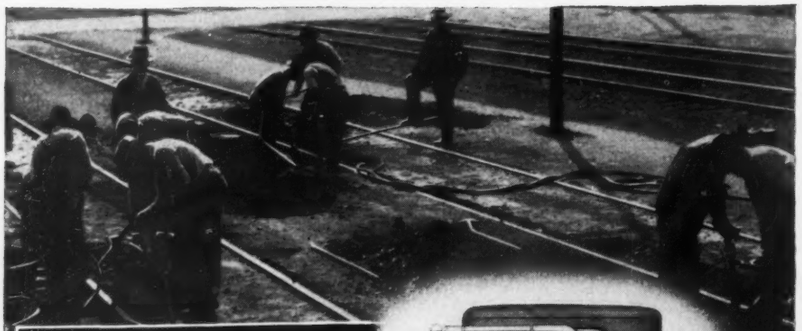
Hour after hour—in gravel, sand, clay or rock—operators of Michigan Mobile Shovel-Cranes maintain peak production with a minimum of fatigue. Michigan's Air Controlled Clutches are fast, smooth, positive. No cumbersome levers to push and tug, no rods, toggles or joints to become stiff with grease and dirt. Michigan's Air Controls are job-proven, both in civilian and in military use . . . . Unsurpassed operating speed and truck mobility, plus real stamina and balanced design, are combined in the shovel-crane that has proven "tops" in materials-handling.

3/8 yd. and 1/2 yd. shovels—convertible to crane, clam, dragline, trench hoe. 6, 10 and 12 ton cranes.

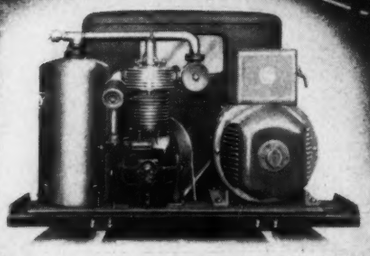
MICHIGAN

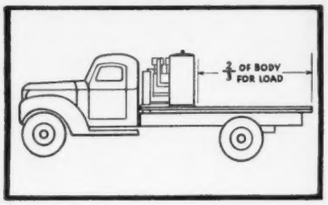
POWER SHOVEL COMPANY

BENTON HARBOR, MICHIGAN



MORE MOBILITY
MORE ECONOMY
WITH DAVEY
AUTO-AIR





There are more construction jobs which require compressed air for a short period of time than there are "steady" jobs which need trailer-mounted equipment. The "short" jobs requiring MAXIMUM MOBILITY make up the big field in which the Davey AUTO-AIR has no competition.

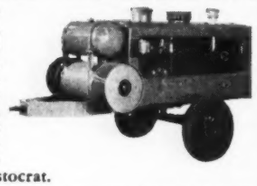
The savings from using *one* engine to drive both the truck and the compressor, of having mobile equipment that can *rush* air, men, tools and material *to the job*, of having electric welding and floodlighting equipment all mounted on the truck if desired — are savings evident to any engineer or contractor.

Durable, time-proved Davey AUTO-AIR compressors are available in 60, 105, 160, 210 and 315 cfm capacities. Can be installed on most trucks.

ANY CONTRACTOR CAN INCREASE PROFIT, CUT DOWN COSTS—WITH THE MOBILITY OF A DAVEY AUTO-AIR COMPRESSOR

DAVEY AIR ARISTOCRAT IS "TOPS" IN PORTABLE COMPRESSORS

There's a place for the conventional, trailer-mounted compressor. That's why Davey engineers one of the finest, stu'diest, most dependable pieces of equipment of this type—the Davey Air Aristocrat.



Here's the famous Davey compressor for the 24-hour-a-day, seven-day-a-week compressed air jobs.

COMPLETE YOUR ENGINEERING LIBRARY

Engineers and contractors are invited to write for the free Davey Catalog E-172. Gives full information on Davey Compressors, Truck Power Take-Offs, Pneumatic Saws and additional pneumatic engineering data.

D-145-4

DAVEY *Compressor Co.*
KENT · OHIO

DEALERS IN PRINCIPAL CITIES

HEAVY-DUTY, GENERAL PURPOSE MOWER for highway, park, golf course, airport and identical services is mounted on a Model B Allis-Chalmers tractor, has a variety of travel speeds for all conditions and possesses unusual stability for operations on extreme slopes and difficult angles. Five-foot heavy-duty cutter, in full view of operator, is raised and lowered by a power hydraulic lift.



Inner shoe located outside rear wheels can be raised 12 in. by hand lever. Sickle delivers full cutting stroke through wide range of cutting positions from 45 deg. below horizontal to 60 deg. above, permitting use of machine for highway mowing, cutting slopes and banks, hedges and shoulders. To insure protection for sickle against obstructions, belt drive slippage provides safety relief and prevents damage. Mower design leaves drawbar open and enables tractor to pull gang mowers and other equipment without removing cutter bar.—**Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee 1, Wis.**

Shunk
Superior Quality
BLADES
AND CUTTING EDGES

For any make of machine
Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

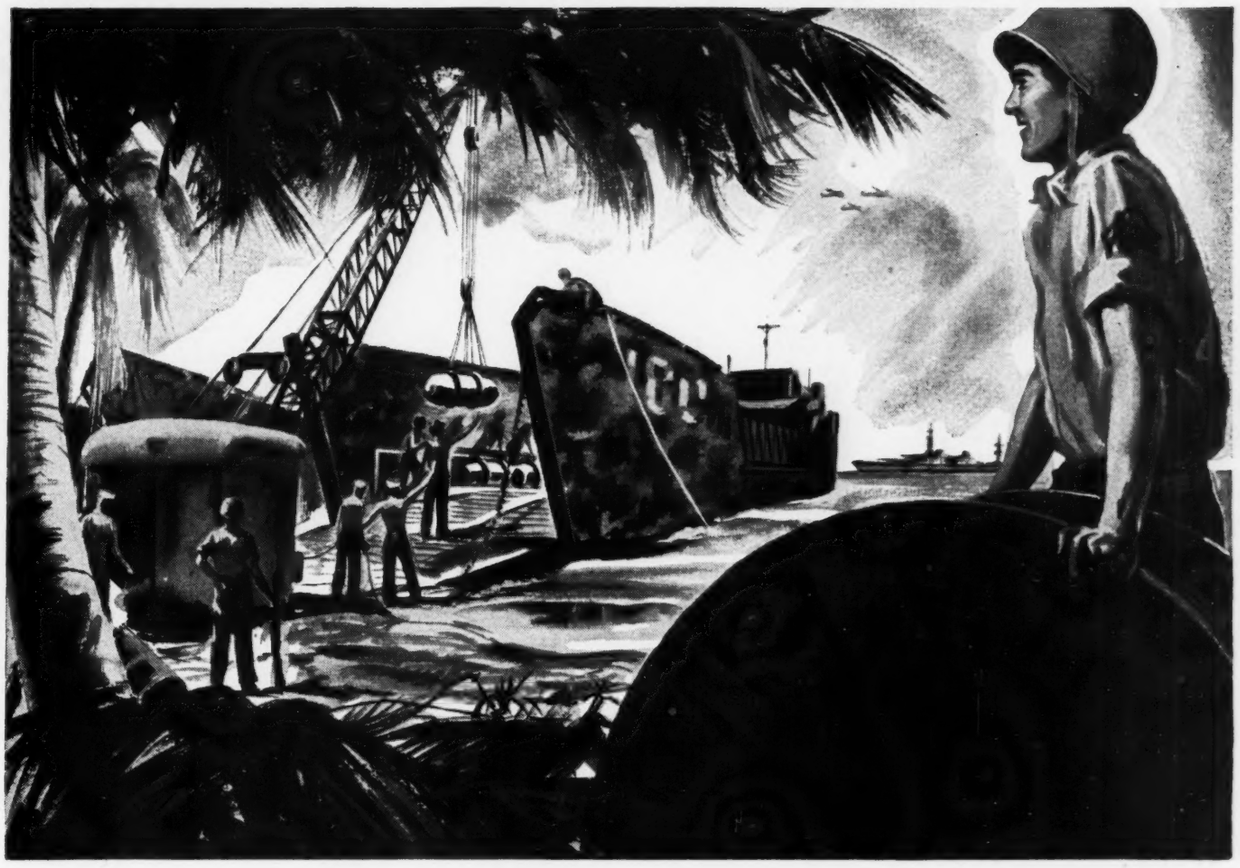
CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

Shunk Member of A.E.D.
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO.



THEY PICK UP "EGGS" WITH WIRE ROPE

Giant "eggs" for our bombers require frequent handling before they are dropped on the enemy. Juggling heavy bombs is one of the vital everyday tasks which our men must perform . . . and one in which tough, dependable wire rope is important.

Less dramatic, but equally important, is the work which wire rope is doing on the home front. In oil fields, forests, mines, mills and shipyards . . . you'll find men relying on the stout, steel muscles of Wickwire Spencer Wire Rope to do a variety of heavy hoisting and hauling jobs.

With wire rope harder to get, each length must be made to last longer. And, when you need new rope, specify WISSCOLAY *Pre*formed, manufactured by Wickwire Spencer. It lasts longer than the non-preformed; is easier to cut, splice and install; is kink-resistant and safer to handle.

If you have a wire rope problem our wire rope engineers will be happy to help solve it. Just write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.



THIS FREE BOOK SHOWS HOW TO MAKE WIRE ROPE LAST LONGER

"Know Your Ropes" contains 82 pages of suggestions on proper selection, application and usage of wire rope. This easy-to-read, profusely illustrated manual can save you money . . . and save wire rope for the war fronts. Send for your free copy now.

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Boston • Buffalo • Chattanooga • Chicago • Clinton (Mass.) • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

"SURFACE PEENED" RAZOR-BACK



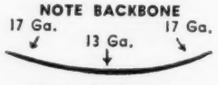
the Shovel with a Backbone that Stands Bending as Well as Wear

Because its middle section is forged thicker all the way up, the RAZOR-BACK Shovel has always had a longer-wearing cutting edge, a stronger frog and socket. Its tapered sides have kept it light in weight. Now, by "Surface Peening," we have toughened the steel itself, made it actually 2½ to 5 times more resistant to the bending that causes ordinary shovels to break from constant use. For longest life, most shovel service per dollar, buy RAZOR-BACK. *Send for Catalog and prices.*

THE UNION FORK & HOE COMPANY
655 Hocking Street, Columbus 15, Ohio

Standard tests of the American Society for Testing Materials show how RAZOR-BACK "Surface peened" steel ("A") withstands continuous 2-way bending longer than fine heat-treated steel —

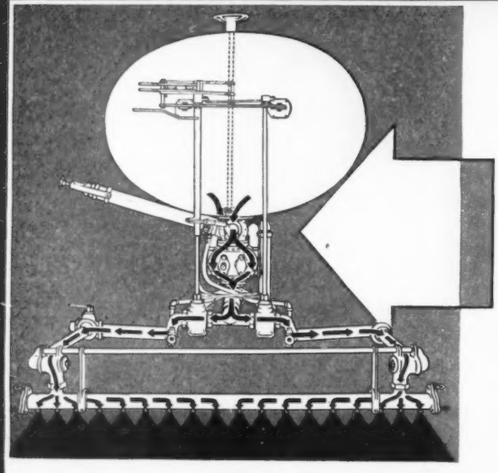
2½ times longer at extreme of 90,000 lbs. per sq. in.
5 times longer at 80,000 lbs.
Unlimited at 70,000 lbs.



Cross Section of Razor-Back Blade

ALSO MAKERS OF STONE, BALLAST AND INDUSTRIAL FORKS—ASPHALT AND ROAD RAKES

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS



COMPACT CIRCULATING SYSTEM

Takes shortest line from tank to spray bar...

NO WASTE of heat or energy from long travel of hot or cold material.

LEAKPROOF... no pipe fittings. Service any part without disturbing remainder of system.

Less than 5 cubic feet required for entire circulating system, including pump. Handles all grades asphalt, tar, emulsion or road oil.

E. D. ETNYRE & CO., Oregon, Illinois

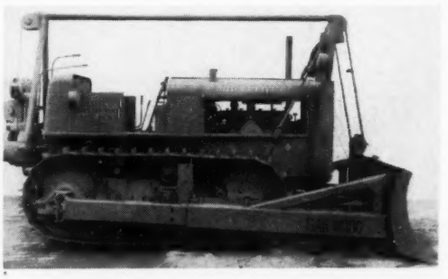
CABLE AND PIPE LOCATER for use in locating exact depth and position of buried pipes and wires, has a lamp circuit for checking all connections after test has been set up, a detector coil and a neutral exploring coil. Built-in spirit vial enables operator to maintain level for absolute accuracy. Set mounted in sturdy hardwood cabinet and comes with high quality receiver, ready for use.



Useful device for any one faced with necessity of finding old pipes and wires which have been buried for many years and on which records have been lost. Especially valuable for checking depth of cable at river crossings or for determining whether or not a service pipe is below frost line after a street has been lowered or regraded.—**W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill.**

★ ★ ★

CABLE BULLDOZER, known as the "Dozecaster" and operated in connection with Gar Wood cable control unit in both single and double drum types, is now available in limited quantities for essential civilian use. This new dozer of the angling blade type is designed to place the moldboard close to the radiator for better balance and easier pushing.



Tilting of the moldboard is achieved by the use of a double trunnion on the main frame which eliminates necessity of installing a tilting mechanism on the moldboard itself. This takes weight from front and contributes further to better balance. There are no screw thread adjustments to get battered. Sheaves are of steel, hardened in the rope grooves and mounted on hardened and ground shafts with roller bearings for longer life.—**Gar Wood Industries, Inc., Detroit 11, Mich.**

Tough Terrain!

But NOT too tough for CLEVELAND Wagon Drills!



● The mountain side is so steep on this road-building job that the wagon drills must be held with ropes. Yet even under such difficult conditions the Cleveland DR30 proves its mettle.

As this picture indicates, the DR30 is unsurpassed in maneuverability. The machine drills at *any* angle and in *any* direction—flat holes from 4" to 8' above ground—also straight up or down. Feed travel is over 8', permitting 6-foot steel changes, and the machine handles depths to 25' or more. The DR30 has a double screw U-bar jack, a recoil device to increase cutting speed, an improved centralizer, and a forward leg point to steady the drill. All these features make the Cleveland DR30 the most popular wagon drill ever built.

ASK FOR BULLETIN 132

Pneumatic tires now obtainable if specified by purchaser in his application for priority to Construction Machinery Branch of War Production Board.

SPEED FINAL VICTORY!
BUY MORE WAR BONDS

LEADERS IN DRILLING EQUIPMENT

BRANCH OFFICES

Birmingham, Ala.	Dallas, Texas	Los Angeles, Calif.	Salt Lake City, Utah
Boston, Mass.	Denver, Colo.	Milwaukee, Wis.	San Francisco, Calif.
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Cincinnati, Ohio	Lexington, Ky.	Richmond, Va.	

CANADIAN DISTRIBUTORS
Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.

THE CLEVELAND ROCK DRILL CO.
DIVISION OF THE CLEVELAND PNEUMATIC TOOL COMPANY
CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO

Republic's

"HI-GRADER"

—The Conveyor Belt Constructed for *Big* Earth-Moving Jobs





Hi-Grader is designed for heavy duty service day after day on elevating road graders. Republic combines a strong, yet flexible, duck body with abrasion-and-cut-resisting rubber covers to withstand the punishing abuse of this service. The heavy upper cover is further reinforced with a fabric breaker strip, which anchors the cover to the strong multi-ply body. This exceptional quality has given Hi-Grader a proven service record on road equipment operating under severe conditions. Consult your Republic Distributor on these belts and other mechanical rubber products.

WE ARE PARTICIPANTS IN THE OWNERSHIP AND OPERATION OF NATIONAL SYNTHETIC RUBBER CORPORATION

Better than Before

REPUBLIC RUBBER

DIVISION

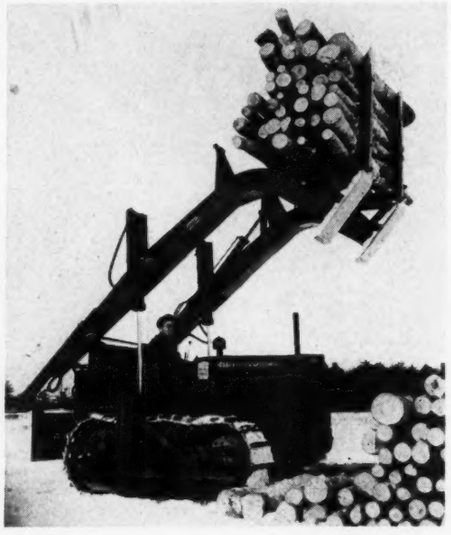
LEE RUBBER & TIRE CORPORATION

YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS YOUNGSTOWN, O.

LEE DELUXE TIRES AND TUBES CONSHOHOCKEN, PA.

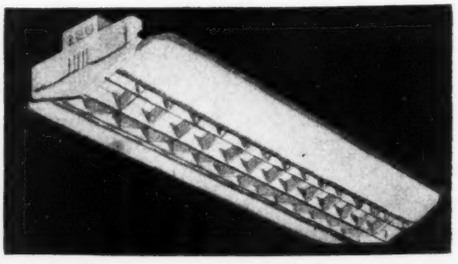
LOG LOADER, known as the Drott Skid-Loader, is claimed to move a cord of pulpwood from pile to truck in about 1½ min., a job which would require services of 25 men if done by hand. Loader consists of steel frame with rack attachment mounted on 60-hp. diesel tractor. Hydraulically operated, it has a lifting capacity of 6,000 lb. and a loading height of 10 ft. Rack which holds wood is made of two separate lower arms and two



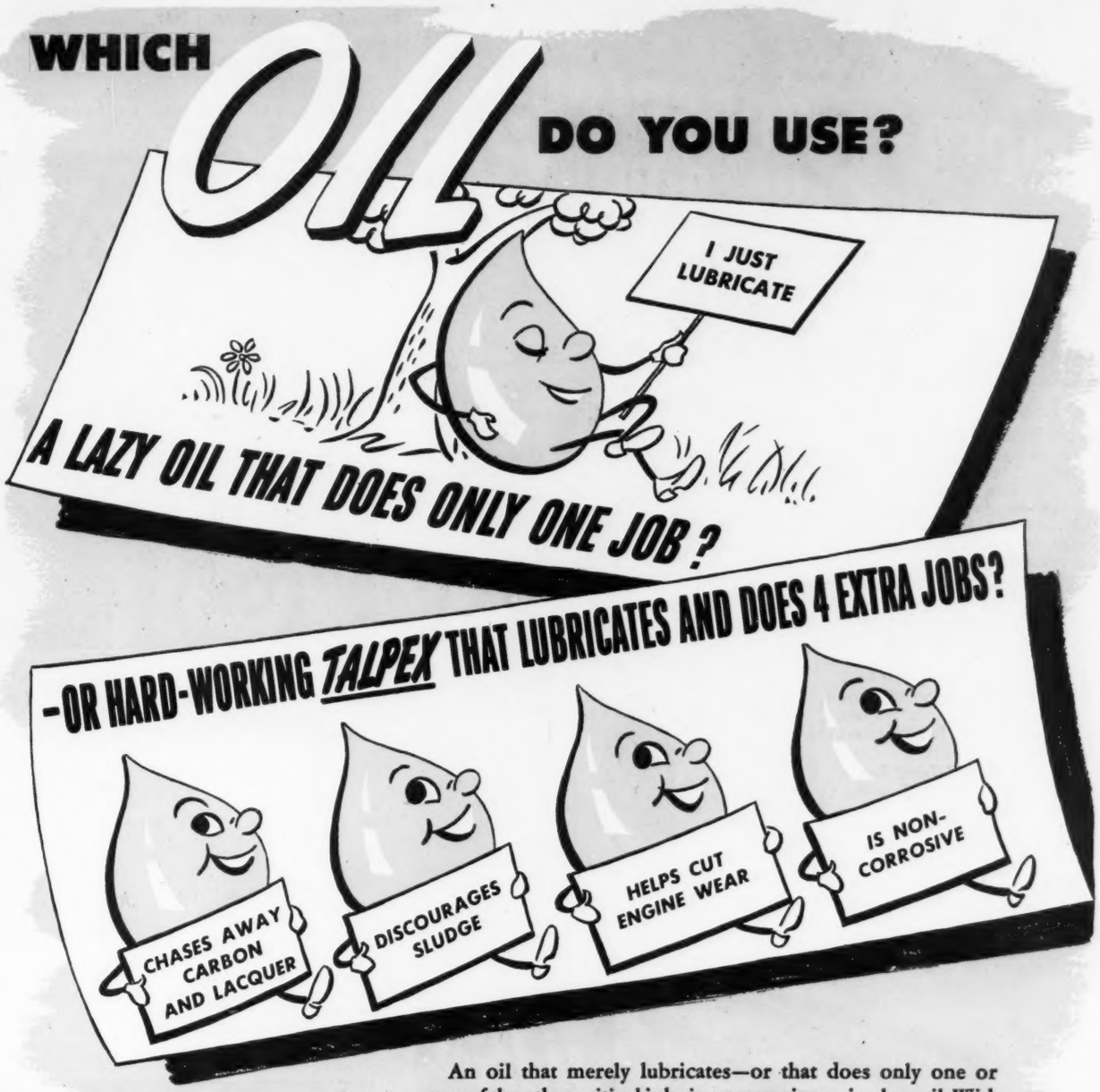
joined top arms. Lower arms are pushed in stack of pulpwood by forward motion of tractor and load is then clamped tight by top arms pressing down hydraulically. Securely held load then is lifted upward and tilted toward unit. Tractor backs away, lowers wood and skids it to place of disposal. Here it may be stockpiled or loaded into truck, sled or flat car. Besides pulpwood, loader is suitable for handling posts, poles, railroad ties and other forest products. Also adaptable for transporting, loading and piling anything from light shavings to rock when fitted with proper type rack and bottom structures.—**Hi-Way Service Corp., Milwaukee, Wis.**

★ ★ ★

NEW FLUORESCENT LUMINAIRE combines lamp-shielding and glass diffusion in same light. Provides strong, efficient down-lighting through Eggcrate louvres plus diffused side-lighting through



glass panels. Modern Eggcrate Aristolite has panelled and die-cut ends which afford pleasing light-window design. Glass panels and Eggcrates are separately removed for easy maintenance. Fixture is available for continuous installation and can be suspended from ceiling or mounted directly to it.—**The Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Mo.**



An oil that merely lubricates—or that does only one or two of the other critical jobs in your engines—is a lazy oil. With today's operating conditions . . . the high cost of repairs . . . the scarcity of good spare parts . . . you simply can't afford to use a lazy oil.

To get the utmost in performance from your engines, use hard-working Shell TALPEX. This versatile oil has *all* the properties needed to do the many critical jobs necessary to keep your engines running smoothly and efficiently under the most severe operating conditions.

SHELL TALPEX

1. Has high detergency. Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

2. Has exceptional Oxidation Stability. Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

3. Has low Carbon-Forming Tendency. Reduces ring sticking and wear. Lengthens engine life.

4. Is non-corrosive to alloy bearings. Protects all lubricated engine parts against corrosion.

If the oil you now use is not doing all these jobs, it's lazy—should be changed to hard-working Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

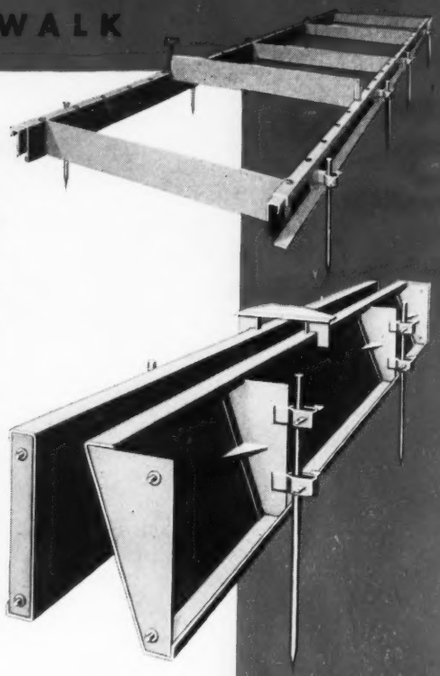
THE ALL-PURPOSE, HEAVY-DUTY LUBRICANT

for trucks, buses, tractors, shovels, stationary and marine Diesels.

HOW TO

improve appearance and save money

ON CONCRETE CURB, GUTTER AND SIDEWALK



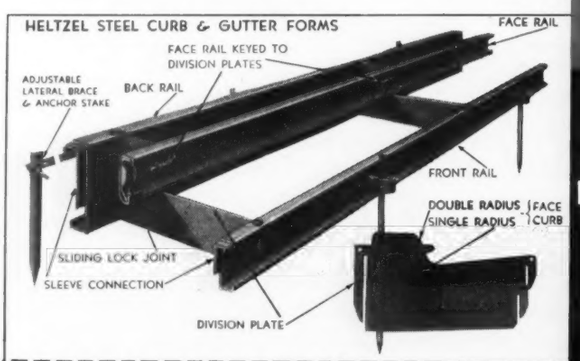
You buy Heltzel Steel Forms once. They stay in service for 20 years or more and each job you set is as uniform as the ones before. The low cost of the equipment per year of service plus the benefits of faster work with the use of forms net substantial savings.

Rigid, self-interlocking Heltzel Steel Forms make the setting and stripping job much easier and faster. No warping, no chipping, no replacements.

Heltzel has been engineering steel forms for 36 years. No matter how complicated or individual your specifications, we can furnish forms for your work.

Purchase of Heltzel Steel Forms for municipal sidewalks, gutters, and curbs enables cities and towns to establish a sound employment program. No other method for setting concrete offers so many advantages.

Write today for engineering data Bulletin A-20-F on Heltzel Steel Forms.



Send me catalog A-20-F
"Steel Forms for Building Concrete Curbs, Curb and Gutters, or Sidewalks"

Name_____

Address_____

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(Type of construction usually engaged in)

HELTZEL STEEL FORM & IRON CO. WARREN, OHIO · U. S. A.

Heltzel BUILDS IT BETTER

- BINS, Portable and Stationary
- CEMENT BINS, Portable and Stationary
- CENTRAL MIXING PLANTS
- BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)
- BITUMINOUS PAVING FORMS
- ROAD FORMS (with lip curb and integral curb attachments)
- CURB FORMS
- CURB AND GUTTER FORMS
- SIDEWALK FORMS
- SEWER AND TUNNEL FORMS
- CONCRETE BUCKETS
- SUBGRADE TESTERS
- SUBGRADE PLANERS
- TOOL BOXES
- FINISHING TOOLS FOR CONCRETE ROADS

NEW FLUORESCENT LAMPS, providing instant starting, higher efficiencies and simplified installation and maintenance, are now available in smaller diameters and in standard lengths up to 96 in. Operated without starters, these lamps designated as LS types, may also be operated in



series on a single ballast at 100 to 200 milliamperes or at other currents within this range to provide high lighting levels or lower intensities for industrial and commercial installations. Elimination of starters simplifies maintenance. Life of these lamps is expected to be comparable to that of 40-watt standard fluorescent lamps.—**Sylvania Electric Products, Inc., Salem, Mass.**

★ ★ ★

WELDERS' CAPE, known as Amcoweld Pro-Tecto-Cape which is said to give full protection when welding in all positions, is made of high grade durable chrome leather with underarm flaps and



collar which may be turned up so that wearer is safe even when doing overhead welding. Collar is securely held in an upright position by special tabs and a snap fastener. Advantages: freedom of movement and adequate ventilation. Bib front equipped with snap fasteners for easy removal. —**Eastern Equipment Co., Inc., Willow Grove, Pa.**

SURFACE SMOOTHNESS
is its business





Engineered from the ground up for precision operation, the Austin-Western Tandem Roller with its—

Variable Weight — **Rigid Box Frame**
Smooth Power — **Hydraulic Steer**
More Visibility — **Less Overhang**
More Clearance
Convenient Single or Dual Controls

performs in a manner that meets all specifications for high-type surfaces.

The Austin-Western Line also includes 3-Wheeled Rollers. Catalogs are yours for the asking.

AUSTIN-WESTERN COMPANY,
AURORA, ILLINOIS

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

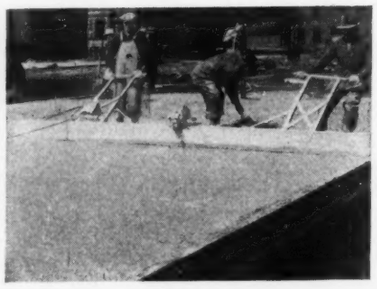
BUY MORE WAR BONDS

SYNTRON

"Pulsating Electromagnet"

CONCRETE FORM VIBRATORS

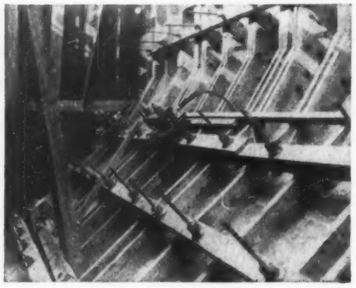
with quick-actng vise clamp



SAVE CONCRETE—

SPEED UP PLACING AND SETTING

Applied to thin wall forms—pipe forms—as vibrating screeds —also for bolting to bins, hoppers and chutes to provide a fast, free flow of sand, cement, aggregate, etc.



3600 Vibrations per minute

No cams, bearings, eccentrics or other moving parts to wear out.

Write for catalog folder.

SYNTRON CO.

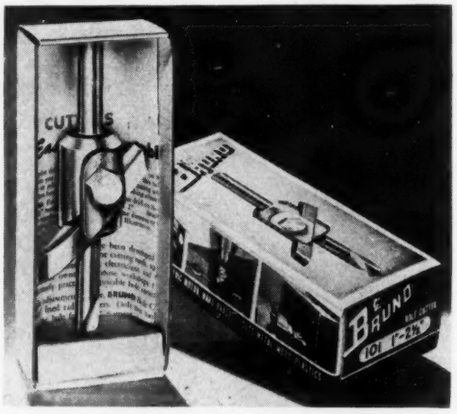
500 Lexington **Homer City, Pa.**

BROWNHOIST BUCKETS



The greedy jaws of Brownhoist clamshell buckets speed up material handling in dirt, clay, coal, gravel and ore. Their deep, clean bites practically eliminate hand shoveling. Extra sturdy. Large sheaves reduce rope wear to a minimum. AVAILABLE IN ROPE-REEVE, POWER-WHEEL AND LINK-TYPE. For facts and prices write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

ADJUSTABLE HOLE-CUTTING TOOL, designed to operate in light drill presses, portable drills or breast drills quickly cuts smooth holes in wood, steel brass, hard rubber, aluminum, fiber, plastics and problem materials which might necessitate use of torches or other equipment. Two models are available, one which cuts holes to any diameter from ⅝ to 1¼ in. through ⅛-in. thickness; other which covers all expansions from 1 to 2½ in. through thicknesses up to ⅜ in. Tool consists of



drill which starts hole and also serves as pilot for tool, a hardened body with a milled slot into which is set a specially ground high speed steel tool bit, and a hardened ground shank. Adjustment is obtained by loosening hexagon bolt which holds firm locking clip, and sliding blade to correct distance from pilot. Thickness capacity of tool varies with type of material to be cut. Metals up to 3.8-in. thickness are cut quickly and smoothly. Wood, plastics and compressed materials may be cut to much greater thicknesses, capacity in most instances being unlimited. Useful for cutting holes for repair and maintenance and for pipe or ventilators; in switch boxes, panels, partitions and floors.—**Bruno Tools, Beverly Hills, Calif.**

★ ★ ★

DOWEL SETTING MACHINE eliminates all accessories in connection with supports for dowels in placing of concrete pavement and reduces by about 80 percent the man-hours required for placing such dowels. Machines built to date are for 25-ft. wide strips of paving and are readily adjustable to place dowels ranging in length from



14 to 24 in. and in diameter sizes from ¾ to 1 in. Machine will place dowels to any desired pattern with almost perfect uniformity, an important accomplishment since dowels are embedded in slab for purpose of reinforcing across a planned plane of weakness and after crack has formed, it is essential to assure proper functioning of dowel for expansion and contraction.—**M. H. Golden Construction Co., 3485 Noell St., San Diego 1, Calif.**

For the TOUGH Jobs Ahead!

GAR WOOD ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER

When the tremendous after-Victory program of road building and construction breaks, all present indications point to these conditions: 1. An abrupt change back to the prewar trends of competitive contracting. 2. Ever lower costs will become increasingly important. 3. The profitable business will go to the contractors who use the most efficient methods and machinery.

You can meet these conditions with Gar Wood Road Machinery and Allis-Chalmers Diesel Power. Here is an unbeatable combination that has what it takes to shove through the toughest jobs, fast—machinery that is dependable, economical, proved. Plan now to standardize on the complete line of Gar Wood Road Machinery. Get the facts from your Allis-Chalmers dealer.

SPECIFY GAR WOOD FOR OUTSTANDING PERFORMANCE



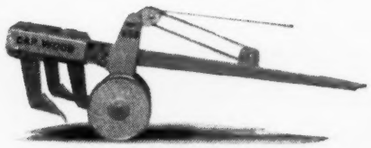
Cable Dozecasters



4-Wheel Hydraulic Scrapers



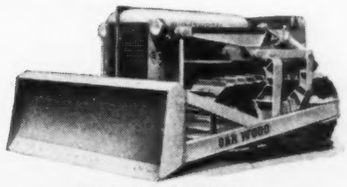
2-Wheel Hydraulic Scrapers



Heavy Duty Rippers



4-Wheel Cable Scrapers



Hydraulic Bulldozers

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

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OTHER GAR WOOD PRODUCTS: HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

"THE OLD RELIABLE"

THERE'S NOT ANOTHER LIKE IT!



Straight line LEVERAGE..

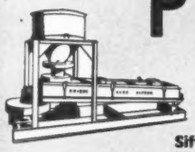


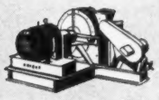
See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear, in a straight line and with a square contact. The pawl is in *compression only*—no shear, no tension, no torsion. The shipper carries none of the load. This strong construction insures steady service.

LOWELL WRENCH CO., Worcester, Mass.

Materials

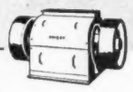
PROCESSING EQUIPMENT





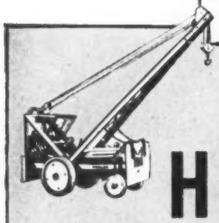
Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.

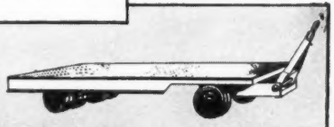




The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by

MERCER-ROBINSON, CO., INC.
30 CHURCH ST., NEW YORK 7, N. Y.

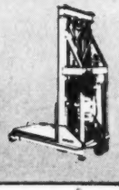




Materials

HANDLING EQUIPMENT





Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton) Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.

PRINTER-DEVELOPER designed to provide simple, economical and efficient facilities for those who require black and white prints in medium quantities, has a printing speed range up to 6 ft. per min., depending upon the transparency of the original, printing either roll stock or cut sheets with a printing width of 46 in. Light source is a 2,000 watt glass mercury vapor lamp within a 6-in. dia. cylinder, assuring uniform distribution of light over the entire printing area of the cylinder. Entirely new method of cooling pulls air into and



through the cylinder and contact bands, resulting in minimum machine temperature. Uniform cylinder temperature within a few degrees is maintained, thus assuring uniformity of print exposure. Printing speed is controlled by single knob, easily-read dial located within convenient reach of operator. Suction through bands simplifies feeding of tracings and sensitized paper and the tangential method of feeding assures safety to tracings and eliminates pinching or catching. Tracings and prints removed without scraping, thus insuring long cylinder life. Front pedal located at floor level and at center of machine instantly releases band tension so that misfeeding of roll stock can readily be corrected. Printing unit has anti-friction bearings, easily lubricated, ball bearing motors and a cylinder readily accessible for cleaning. New type ironing roll in developing unit assures flat, dry prints. Mounted on four casters.—**Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41, Ill.**

★ ★ ★

POWDERED RESIN GLUE, hot-press phenolic product labelled Plaskon 810-12, is extensible with wheat flour and thus permits unusual economy in plywood and furniture manufacture. Used without extension, new glue is said to meet rigid requirements in water and weather resistance. Plywood made with it can be used under prolonged or constant extremes of temperature and humidity. Glue said to be more resistant than wood to effects of fungi, acids, alkalies, oil grease, fumes and aging. No special skill is required for mixing or using it. No unusual preparation of wood is necessary and a wide latitude of moisture content in wood is allowable.—**Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio.**

For Complete Facts

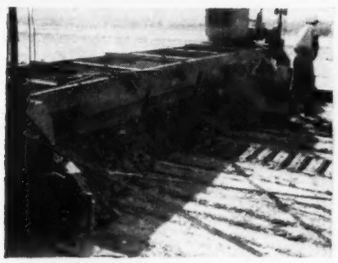


send for this folder

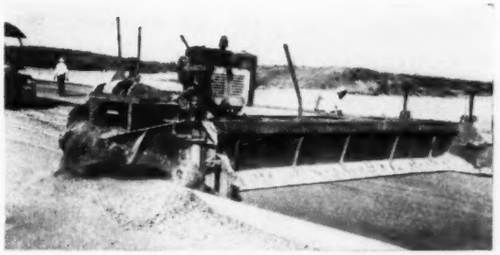
The many unique features embodied in the new Standard-Lewis Subgrader come as a result of design by practical paving equipment engineers. These men know well the problems encountered and have built into this machine many practical improvements that save contractors, time, labor and money.

The new Standard Steel 8-page folder covers in detail all information relating to the efficient operation and economy provided by this ingenious Subgrader.

A request on your letterhead will bring a copy promptly.



This is an example of deep cutting into tough material—gravel as large as 14" in diameter is handled with ease.



No chipped or broken edges of concrete pavement is experienced with the solid rubber tired wheels you can use on the STANDARD-LEWIS Subgrader.

OTHER STANDARD PRODUCTS

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TANDEM ROLLERS
TOW BROOMS
BINS AND BATCHERS
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STANDARD STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California



No matter what Paint Vehicle is needed . . .

- SYNTHETIC RESINS
- NATURAL RESINS
- MODIFIED SYNTHETICS
- DRYING OILS

RED LEAD'S WIDE COMPATABILITY

makes its Extra Rust Protection Available

The fact that Red Lead is generally accepted throughout industry as the standard metal protective paint indicates two things:

1. *That it must be widely adaptable to various service conditions.*
2. *That it must offer something* EXTRA *in the way of rust prevention.*

Red Lead's versatility is due principally to its compatability with the wide range of vehicles needed to answer present-day service demands. It can be used with practically every type of paint vehicle on the market—synthetic resins, natural resins, drying oils, and combinations of these.

Thus, paints for any metal protective purpose can be formulated with Red Lead. Since almost any paint vehicle can be used with Red Lead, a broad range of drying requirements can be met—anything from the normal drying primer used on structural steel to the quick-drying paint essential to present-day production schedules.

Why Red Lead means Extra Rust Protection

Red Lead has the property of counteracting acid conditions, recognized as accelerators of rust. In the presence of various acids, Red Lead forms insoluble lead salts at the approximate rate at which the acids are supplied.

This is true whether the acid originates from acid-forming environments, such as gas, smoke and moisture in the atmosphere, or from the decomposition of the vehicle. Thus, a rust-inhibiting condition is maintained with a Red Lead paint.

Red Lead also forms an adherent protective shield which prevents electrochemical action, another prime cause of rusting.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a metal paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint.

No matter what price you pay, you'll get a better paint for surface protection of metal, if it contains Red Lead.

Write for New Booklet—"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas—ranging from Red Lead-Linseed Oil paints to Red Lead-Mixed Pigment-Varnish types. If you haven't received your copy, address nearest branch listed below.

* * *

All types of metal protective paints are constantly being tested at National Lead's many proving grounds. The benefit of our extensive experience with paints for both underwater and atmospheric use is available through our technical staff.



NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston, W. Va. (Evans Lead Division).

DUTCH BOY RED LEAD

"...now use Ring-Free exclusively..."



Excerpts from letter of—
N. G. HILL
N. G. Hill & Co., Contractors
Phoenix, Arizona

"...four years ago, after we purchased a fleet of Chevrolet trucks for a road construction job on Highway 77, we were induced to try Ring-Free Motor Oil.

...the test was a tough one due to weather conditions...heavy snow and rain in winter...heat and dust storms in summer.

...during all this time we did not pull a head or pan in any of the trucks except one damaged by striking a huge boulder.

...after the job was completed we removed heads and pans on all motors which had from 50,000 to 60,000 motor miles.

...all compression rings were free...all drain holes in oil rings open...also drain back holes in pistons completely open and no carbon on the under side of the pistons. Cylinder heads and valves were also clean and all valve stems free in the guides. Engine pans and oil pump screens were cleaner than we expected...all bearings were in good shape.

...we now use Ring-Free exclusively in all our equipment*...we recommend Ring-Free Motor Oil to other contractors."



* *36 Trucks—Fords, Chevrolets, Internationals; 6 A.C. Tractors, Diesel powered. 1 D-8 Caterpillar; 3 Graders—2 powered by International and 1 by Caterpillar motor; 1 International T. D-40 Tractor; 1 Lorraine 40—¾ cubic yard power shovel; 3 Light Plants powered by Kohler motors; 1 Gravel plant powered by 8800 Caterpillar Diesel. Also numerous pick-ups and station wagons.*

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

MACMILLAN RING-FREE MOTOR OIL

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HOW A B-G BUCKET LOADER KEEPS YOUR TRUCKS *Rolling*



• Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

There is no cheaper way to load bulk materials . . . no better way to hold labor costs down.

No time lost getting into position. With its crawler mounting, you can get over soft spots, maneuver in cramped corners easily.

Cutting action across the full width of the feeding spirals keeps the buckets full. Material is delivered at top capacity from stockpiles, natural deposits, and during light excavating, stripping, or shoulder shaping. You have twelve crowding speeds to cope with any loading condition.

There are a score of other advanced mechanical features in the B-G Bucket Loader that will help you save money on every material handling job. Write for free literature. Barber-Greene Company, Aurora, Illinois.



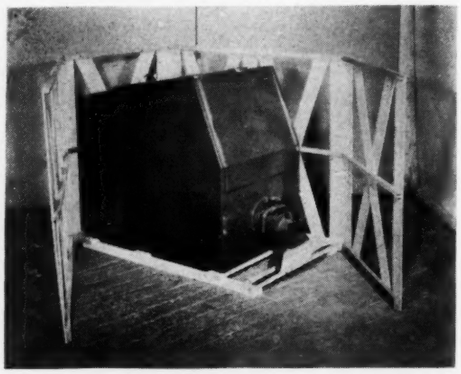
By substituting a B-G Snow Loader boom, your Barber-Greene Bucket Loader can be used for street snow removal during the winter months. Conversion is quick, easy, economical.

45-7A

Barber B-G Greene

Constant Flow Equipment

WIREBOUND CRATE for hopper shipment is ready for day when hoppers for stokers are again shipped across the nation. These crates have been tried and tested and are said to offer sufficient protection for the 275-lb. hoppers and to save about 17 lb. shipping weight per unit. In placing hoppers for shipment in these wirebound crates,



front of hopper is held down on base of container by metal straps firmly fastened to wooden braces. This device keeps heavy hopper from any rocking movement during transit. Intermediate cleats are used to reinforce crate, thus providing adequate strength. Built-in unit-like parts which assure easy and flat assembly. Crates are stored in flat "mat" form, saving storage space.—**General Box Co., 500 N. Dearborn St., Chicago, Ill.**

You Can Help

• Paper is a Number 1 war material shortage — because over 700,000 different war items are wrapped, packaged, labelled, tagged, or made from paper or container board. The Pacific war, when it speeds up, will require stupendous amounts of paper and board since double and triple packing are required for protection against weather, insects, etc.

So please—

1. Share this magazine with your associates. Because of the paper shortage, the number of copies is limited.

2. Organize for a continuous drive in your office and plant to collect waste paper of any kind to put into paper salvage. Clean out old files, dead correspondence, obsolete records, useless display materials, cartons.

Aid the war effort—speed victory
DO THIS EXTRA BIT TO HELP.

THE SARGENT OVERHEAD
IS GOOD TO LOOK AT....



....AND BETTER TO *WORK* WITH!





IT'S VERSATILE—The Overhead is a tractor loader, a bulldozer, a snow loader and can be used as a crane. It will do a hundred different jobs like digging and loading earth, rock or hard pavement.

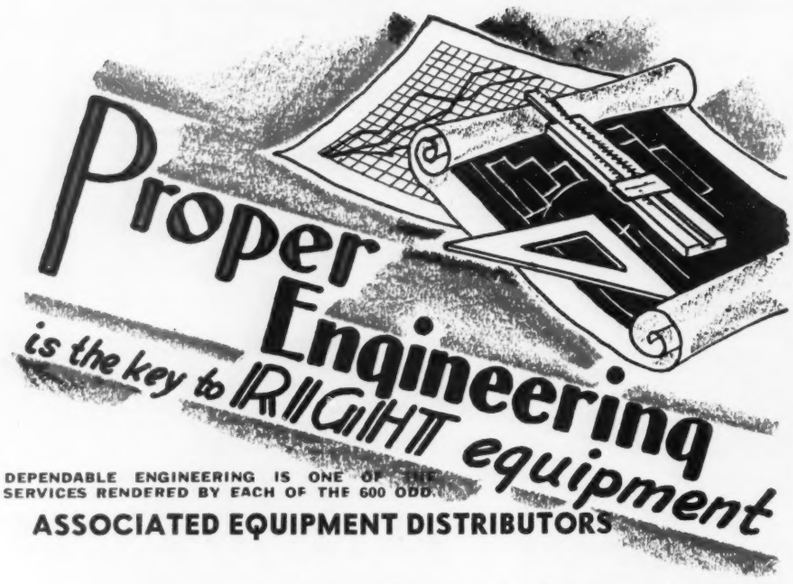
IT'S TOUGH—Because it was designed for hard digging in gravel pit, street excavation, or loading frozen snow. As a bulldozer it has plenty of down pressure.

IT'S FAST—The Overhead works in a straight line motion. There is no twisting and turning to ruin tractor running gear. In average digging it will load a truck in two minutes.

IT'S PROFITABLE—The Overhead is a great machine for town, city or state public works; and it makes an ideal one-machine business for small operators. It's easily transported from one job to another on truck or trailer,—or under its own power.

For details contact your nearest Oliver-Cletrac dealer

MAINE STEEL
INCORPORATED
SOUTH PORTLAND, MAINE



DEPENDABLE ENGINEERING IS ONE OF THE SERVICES RENDERED BY EACH OF THE 600 ODD

ASSOCIATED EQUIPMENT DISTRIBUTORS

These reliable distributors of construction machinery with their many branch service shops are located throughout the 48 States of the Union, in Canada and Mexico.

Use their trained and experienced construction technicians to help you decide upon the right equipment for your next job. In their files are records and case histories of thousands of jobs.

If your problem is earth-moving, excavation, ditching, mining, quarrying, blasting, dam building, road building, paving, airport or housing development, highway maintenance, power development or marine propulsion—regardless of the job, here is a National organization of individual organizations ready and willing to help you—engineering-wise and service-wise.

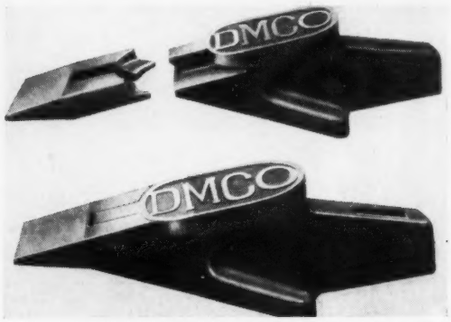
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ASSOCIATED EQUIPMENT DISTRIBUTORS

NATIONAL PRESS BLDG. - - WASHINGTON 4, D.C.

TWO-PIECE DIPPER TOOTH for use on dippers, clamshell, dragline and trencher buckets consists of two parts, the "Penetrater Point" and the "Weldapter." Design permits easy replacement of point which is double-keyed to the Weldapter and tackwelded. When point becomes worn, it is readily removed and new point installed by simply slipping it on Weldapter and tackwelding at several points along side and across end where



parts join. Welds hot point in place. Double-key supports, one lengthwise and one crosswise of both parts, take all digging stresses upward and downward, as well as side thrusts and impact shocks. Penetrater point has sharp, thin cutting edge that rapidly penetrates, even when digging tight, compacted material, thus reducing power requirements and improving efficiency of any type of dipper or bucket by providing smoother, faster loading. Points are high quality heat-treated alloy steel forgings and will stay sharp until half part is worn away, necessitating replacement. Weldapter will last indefinitely.—**Daniels-Murtagh Co., 625 C Ave., N.W., Cedar Rapids, Iowa.**

★ ★ ★

NEW TYPE SUPPLY TANK, designed for use with Wood Roadmixer but adaptable for service with other traveling mixing plants, carries road oils, emulsions and cutbacks. Tank, 3,000 gal. capacity, is divided into two compartments holding 1,000 and 2,000 gal. Roper pump, 3-in. dia., powered either with a Chrysler or Ford industrial engine, is mounted at rear. Construction features include tandem rear wheels mounted on walking beam



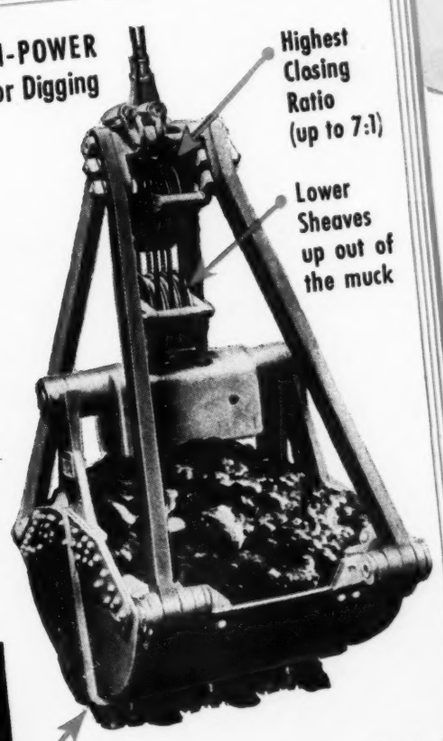
and front wheels mounted on center pin. This, plus springless suspension, eliminates twisting and torsional stresses, keeps load on level keel and gives even distribution of weight. Accessory equipment available includes extra spray bar, insulation and heating unit and wheel-braking system. Addition of spray bar permits watering of sandy air fields and other areas where a supply tank can be towed behind tractor. Specifications: height overall, 9 ft. 6 in.; width, 8 ft. 5 in.; length, including tongue, 27 ft. 6 in.; weight, 9,640 lb.; tire size, 10:00x20.—**Wood Manufacturing Co., 816 W. 5th St., Los Angeles 13, Calif.**



TO ALL CONSTRUCTION SUPTS.

When we buy Buckets let's stick to HAISS

J. E.



More and more contractors are coming to say just that, "Let's stick to Haiss"... It comes when they've discovered that a Haiss Clamshell handles bigger payloads—by total yardage per day, month or year. The "plus" in yardage-handling efficiency is the natural result of a combination of design advantages. *And* the stand-up ability that keeps a Haiss at top efficiency through a long life...Catalog No. 143 on Hi-Power Digging Buckets—No. 343 on "Multi-Sheave" Rehandlers.



GEORGE HAISS MFG. CO., INC., 139th St. & Canal Place, New York 51, N.Y.

HAISS HI-POWER

CLAMSHELL BUCKETS • LOADERS • PORTABLE CONVEYORS

NEW WARTIME

Socony-Vacuum now offers Complete Lubrication Service for Contractors—a service specifically designed to fit the unique requirements of Your business. Read how it helps you meet and beat contract deadlines—helps you keep your equipment on the job full time!



SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
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Socony-Vacuum's New Service for Contractors cludes *many* practical helps that expedite work ave time—out on the job, in the maintenance partment, all through your operation!

Socony-Vacuum's Complete line of quality prodts—exactly the right oil or grease for every piece equipment you use—means more efficient protion, less chance of breakdowns disrupting your uipment "teams." You save hours in the field and, cause you can order all these products from *one* urce, you save bookkeeping and follow-ups in e office, too.

In addition, your Socony-Vacuum Representae is *ready to help you reduce inventory problems* by arranging regular on-the-job deliveries—*to provide job-proved maintenance schedules and ideas* adapted to your individual needs—*to help train inexperienced men* on the "How, Where and When" of Correct Lubrication—*to call in engineering aid* when needed.

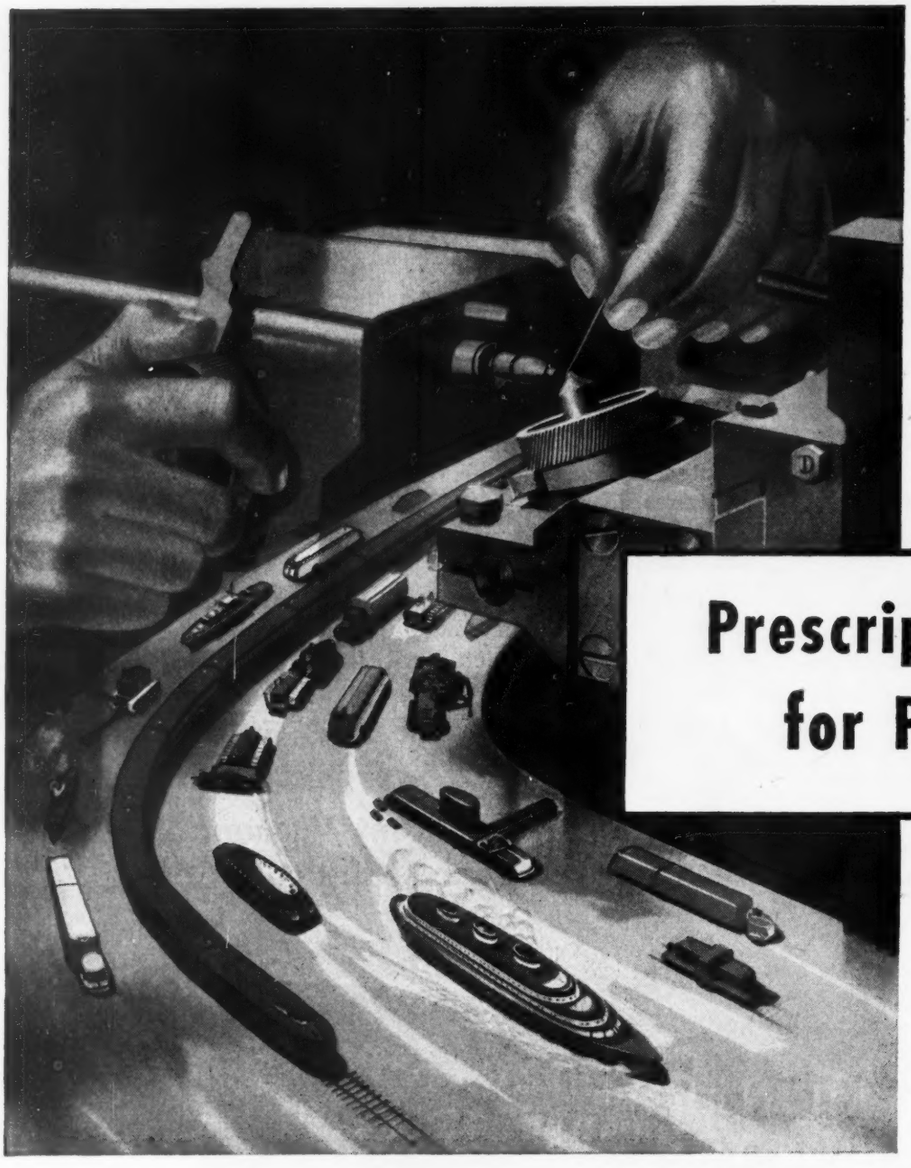
Why be satisfied with fuels and lubricants, alone? Get more in-service hours from your equipment with Socony-Vacuum's Complete Service for Contractors!



"ON YOUR STAFF—BUT NOT YOUR PAYROLL"
—Your Socony-Vacuum Representative



TUNE IN "INFORMATION PLEASE"—MONDAY EVENINGS, 9:30 E.W.T.—NBC



Prescription for Precision

Take a drill as thin as a human hair. Bore finer-than-pinpoint holes through Diesel fuel injection nozzles made of steel. Keep those holes uniform in size; make certain that the angle of each of these pore-like passages is exact so that the fuel may be delivered to the cylinders as a highly-combustible spray pattern of the correct size and shape for maximum engine efficiency.

Those are typical requirements of just one of countless specialized tasks at American Bosch. Two factors make such precision possible. One is craftsmanship that has become a tradition. The other is the knowledge and experience necessary to develop fuel injection and ignition equipment that keeps pace with the accelerating evolution of internal-combustion engines. The combination of these twin skills is known as Precision Production for Power. This is the magnet which continues to draw so many of the Nation's engine builders to American Bosch.

AMERICAN BOSCH CORPORATION • *Springfield 7, Mass.*

AMERICAN BOSCH

PRECISION PRODUCTION FOR POWER

NO CURRENT DROP HERE

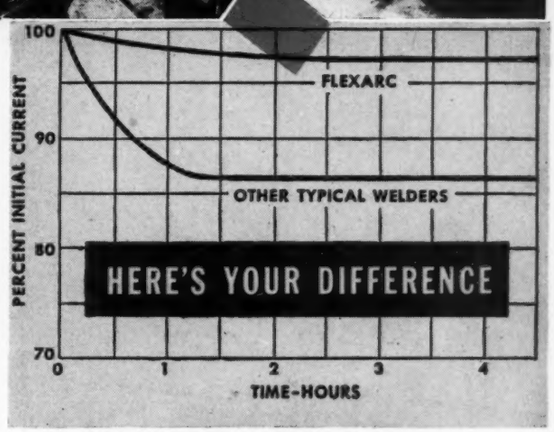


That's why operators prefer a Westinghouse Flexarc Welder. Current is rock steady. Metal melts fast at a uniform rate. One adjustment gives the exact current desired. There is no drop-off when the machine warms up.

But there is another reason for the increase in Flexarc popularity—it's *Arcontrol*—the new welding feature that gives a choice of three types of arc. "Normal" range gives fast, flexible operation that meets most conditions. But when conditions get tough, set the Arcontrol at either "A" or "B" range and instantly you get the kind of arc needed to complete the job—quickly and efficiently.

Just two controls—set the Arcontrol—select the current—no other adjustments are needed—simplified operation that can help you speed operator training.

And with Flexarc on the job, you'll have a machine that is built to give years of service. The Flexarc Welder is completely enclosed in a one-piece, seamless steel frame. There are no extra tin boxes—all vital parts are inside. For complete details about the Flexarc, write for Folder DB 26-100-1, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-21334



The curve shows the extremely small variation in welding current during the "warm-up" period of a Flexarc Welder as compared to the pronounced variation of a conventional welder.

With the Flexarc system of current control, welding current falls off only imperceptibly as the set warms up. Current never varies more than 5% during transition from cold to hot. In conventional type welders this current variation is often as great as 25%—and equilibrium might not be reached for several hours.

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

FLEXARC WELDERS



A Big Success!

LIGHTWEIGHT

WHITEMAN

CONCRETE FINISHING MACHINE



Start earlier, cut cost, on concrete floating, finishing —with model "J". Weighs only 105 lbs. Trowel only 34" diameter. Gives small contractor BIG operator's machine economy. Low cost—anyone can afford. Hundreds being sold to smaller contractors thruout the country. Even green operator does 1000 square feet in 15 minutes.

Model "J"

HUNDREDS IN USE

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For Small Jobs Housing Projects, Etc.

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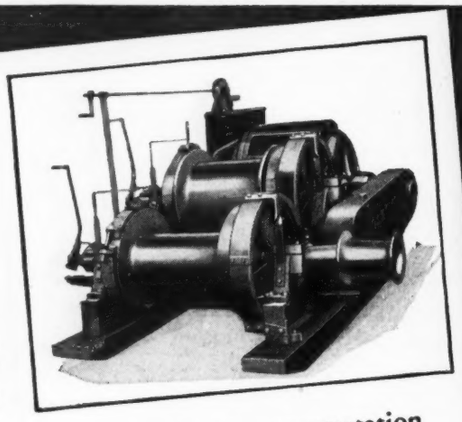
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Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

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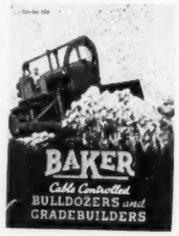
Manufacturing Company

MAIN OFFICE AND WORKS · ELIZABETH, NEW JERSEY

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.



CABLE-CONTROLLED BULLDOZERS—**The Baker Manufacturing Co.**, Springfield, Ill. (16 pp., illustrated) Contains complete details and specifications on new line of cable-controlled bulldozers and gradebuilders designed especially for use with Allis-Chalmers crawler tractors. In these models emphasis is placed on ease of operation, low maintenance and adaptability to field conditions. They feature self-energizing, air-conditioned, cone-type clutches and brakes for cooler, smoother operation and readily accessible brake and clutch adjustments. Units are built with single and double-drum rear end power control units and single drum front end power control units. Special trunnion design permits blade on both bulldozers and gradebuilders to be tilted as much as 12 in. at either corner, increasing usefulness of machines for crowning, ditching and grading. Moldboards, push arms, trunnions and supporting structure are ruggedly built with a view to quick, simple assembly on tractors, according to manufacturer.

★ ★ ★

WIRE ROPE AND CHAIN FITTINGS—**The Thomas Laughlin Co.**, Portland, Me. (32-pp., illustrated). Illustrates, describes, charts and lists prices of, all available items in the line. Comprehensive chart shows at a glance the fourteen vital dimensions of hoist hooks, specifying by hook number the safe load and proper size for proof coil and BBB chains, plow steel and improved flow steel wire ropes. Similar charts cover swivel hooks, turnbuckles, jaws, eyes, shackles and closed and open wire rope sockets. Another chart, never before published, gives comparative strength with recommended turnbuckle size and type for each size rope.

★ ★ ★

STEEL FABRICATION—**Stacey Bros. Gas Construction Co.**, Cincinnati, Ohio. (44 pp., illustrated) Comprehensive picture story of the fabrication and erection of gas holders, storage tanks, processing vessels and other structures is available upon request. Bulletin shows company's production and erection facilities in action and illustrates in detail many of the products such as gas holders, storage tanks and processing equipment used by gas, petroleum, chemical and food industries.

Do You Remember —
That Agile Central Mixing Plant?



The Mystery of the REAPPEARING CENTRAL MIXING PLANT

Engineered BUTLER Design

Be on the lookout for a Butler central mixing plant; height about 75 feet; wearing a coat of gray paint; last reported in the State of Washington; has also been seen in Texas, Utah, and Indiana. Has a long record of production — nearly 600,000 cubic yards of concrete poured, and more to come. 150 yards per hour for days on end.

Though it sounds something like a mystery novel, there is really nothing mysterious about the remarkable performance of this plant — it is a Butler Engineered Design. Butler engineers have been designing plants for more than twenty years, plants whose efficiency, dependability, and versatility are built in. No wonder, then, that they are as good on their tenth job as on their first.

If you have a concrete job, large or small, be sure to call upon the Butler engineer. His suggestions are available to you regarding central mixing plants, ready mixed concrete plants, bulk cement plants, batch bins, and crushing plants. The first step toward the most successful job is Butler Engineered Design.

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

Engineered BUTLER Design

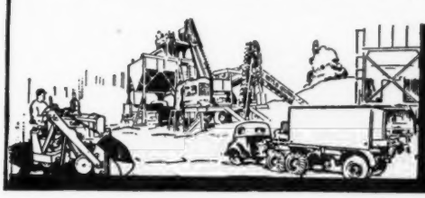
Presto! IT'S REAPPEARED AGAIN!

During 1944 a Butler advertisement appeared which said, "Be on the lookout for a Butler central mixing plant; height about 75 feet; wearing a coat of gray paint; last reported in the State of Washington; has also been seen in Texas, Utah and Indiana. Has a long record of production — nearly 600,000 cubic yards of concrete poured and more to come. 150 yards per hour for days on end."

That Butler central mixing plant with an itch for sight-seeing has now appeared in Arkansas. The prophecy of "more to come" was no exaggeration for the total production of that rugged Arkansas Traveler is today well over a million yards — and — we repeat — "more to come".

A million yards! That's equivalent to a concrete highway 8 inches thick, 20 feet wide and 384 miles long!

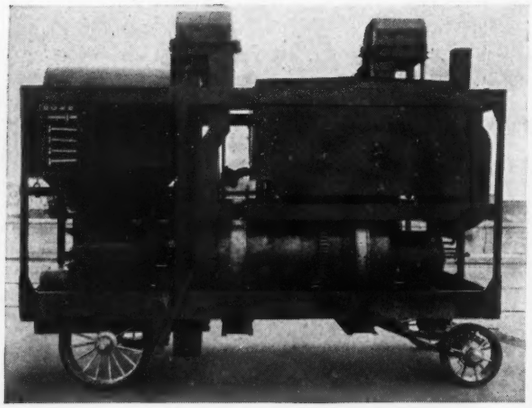
Whether it's central mixing plants, ready mixed concrete plants, bulk cement plants or batch bins Butler Engineered Design generally means *service* far beyond reasonable expectations.



BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN



HERE IS A
Complete
ASPHALT
PLANT



DESIGNED ESPECIALLY FOR HANDLING
Repair Work Efficiently

H&B
ESTABLISHED 1867

For Best Results—
Batch Mix—Hot Mix

● This H & B Patch Plant meets every requirement for speedy, economical repair work. May be set up as a stationary plant on steel columns, or used as a mobile unit—wheel mounted as shown. Will efficiently produce material to meet any standard hot or cold mix specifications. Capacity, 3 to 5 tons per hour. Gasoline or electric power unit optional. Rugged, double-shaft pug mill mixer. Collapsible hoist. SKF bearings throughout. Portable units have rubber-tired wheels and a short turning radius—conforming to highway and street regulations.

Bulletin R-402, giving complete information and flow diagram, will be sent on request.

HETHERINGTON & BERNER Inc.
735 Kentucky Avenue — Indianapolis 7, Indiana



FLOOR AND ROOF SLAB—**The Flexicore Co., Inc.,** 220 E. 42nd St., New York 17, N. Y. (16 pp., illustrated) Ten important advantages obtained by the use of Flexicore, the precast, precured, hollow-cast concrete slab with prestressed-steel reinforcement, are set forth in this booklet for the use of architects, engineers and contractors. Contents include a description of the product, where it is used, how installation time may be saved, and how it is applied.

★ ★ ★



RADIANT HEATING SYSTEMS—**A. M. Byers,** Pittsburgh, Pa. (52 pp., illustrated) How to calculate, design and install radiant heating systems for buildings ranging from monumental type structures to low-cost houses is described in this new handbook entitled, "Byers Wrought Iron for Radiant Heating," chief purpose of which is to serve as a working manual for architects and engineers. Detailed procedure is listed for figuring heat losses and piping requirements, designing the coils, supply and return mains. Factual data is presented on the relative merits of locating the coils in floor and ceiling. Included is a full page drawing of a floor-type radiant heating system for a representative structure in which both sinuous coils and grids are used to advantage. Records in picture and text 23 typical installations covering a wide range of structures, including churches, medical buildings, libraries, taverns, factory buildings, office buildings and residences. In addition to chapters on the theory, history and achievements of radiant hating in more than a thousand installations functioning in the United States, the handbook devotes 12 pages to answering the 34 questions that technical men have asked most frequently during the last 7 yr. at lectures and in letters.

★ ★ ★

BRANCH PIPE OUTLETS—**Bonney Forge & Tool Works,** Dept., 212 Allentown, Pa. (32-p. handbook). Handy pocket-size manual for men responsible for piping illustrates and explains the four simple steps in installing full pipe strength outlets by the WeldOlet method. Also illustrates the tools needed to make the joint, the three types of WeldOlet fittings available for butt-welded, threaded and socket-welded branch pipes and shows typical installations.

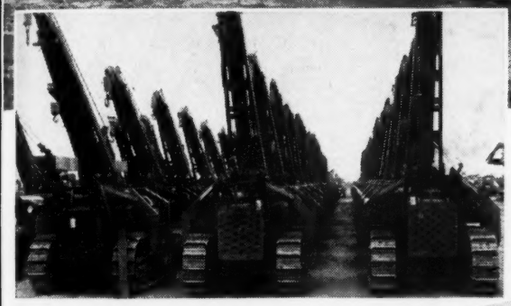
★ ★ ★

ALL-PURPOSE WATERPROOFING AND PROTECTIVE COATING—**Continental Asbestos & Refining Corp.,** 1 Madison Ave., New York 10, N. Y. (4 pp., illustrated) Describes new coating called Liquinoleum, a mineral colloid dispersion containing asbestos fiber in sufficient quantity to reinforce dried film and supplied for use in form of heavy paste. Claimed to protect all types of surfaces and to expand in hot and contract in cold temperatures, thereby providing a coating that will not check nor crack. Liquinoleum is free from benzine, turpentine or gasoline. Applied with a brush it acts like a rubber blanket over any surface to which it is applied.

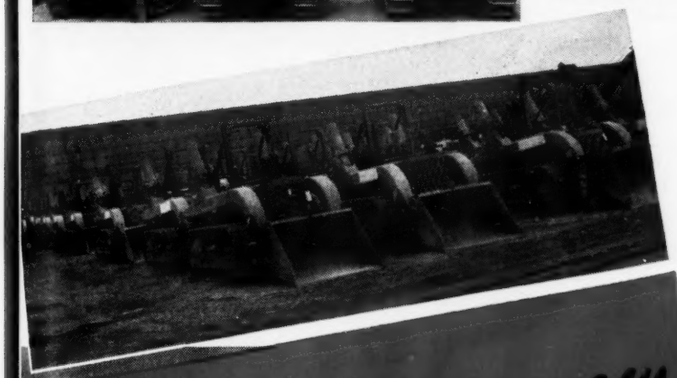
Here Today—

A massive earthmoving fleet of International Diesel TracTracTors, at Port Hueneme, Calif., ready for shipment overseas to the Seabees.





Left: Rows of International TracTracTors with cranes, and left, below: International Diesels with dozer shovels, all massed for shipment to the fighting zones.



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The Navy's Seabees are making history with these big crawlers. Wherever these TracTracTors go, manned by Seabees who are skilled in every phase of construction and earthmoving know-how, they are helping speed Victory. Their record is a record of American valor, American planning, American production.

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INTERNATIONAL HARVESTER

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180 North Michigan Avenue Chicago 1, Illinois

There Tomorrow

Airfield runways are completed in a hurry with equipment like this. International Diesel TracTracTor, with sheeps-foot roller, working for the Seabees in the South Pacific.—Official U. S. Navy Photo.



INTERNATIONAL INDUSTRIAL POWER

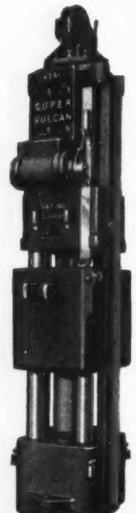
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SUPER-VULCAN OPEN TYPE DIFFERENTIAL-ACTING PILE HAMMERS 18C, 30C, 50C and 80C

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CONSTRUCTION EQUIPMENT—**Blaw-Knox Co.,** Pittsburgh, Pa. (12 pp., illustrated) Describes in detail such construction necessities as steel street forms, self-aligning steel forms, two-screed finishing machines, transverse blade concrete paving spreaders, batching and mixing plants, weighing batchers, turntables, concrete buckets, sheepsfoot tamping rollers, clamshell buckets, and portable steel buildings. Contains many photographs, tables and drawings and considerable technical information of value to the user of construction equipment. It shows, for instance, by drawings and notes, the best way to operate Blaw-Knox spreader vibrators in conjunction with Blaw-Knox finishing machines. Two pages are devoted to a description of capacity, weight and dimensions of various types of clamshell buckets with instructions on the selection of the proper bucket for the proper purpose. Book was designed to help those engaged in general concrete construction and also to supply contractors interested in data on a complete line of equipment for the concrete paving of roads, streets and airports.

★ ★ ★



WOOD RESEARCH AND HISTORY—**Timber Engineering Co.,** Washington, D. C. (36 pp., illustrated) Entitled "The Forest Industries Blaze New Trails," this brochure recites story of wood's usefulness to man, describes current technological developments of wood as an engineering medium, and as the raw material of plastics and chemicals and heralds the dawn of a new age of wood. Wood, the book holds, is capable of being made the most universally useful of all industrial materials. It predicts that the winner in the "Battle of the Giants" in the next quarter century will be determined largely by science and the laboratories in mastering the mysteries of cellulose and lignin, that little known substance, nature's adhesive which holds together the fibers in a tree. Covers pictorially and in text such diverse wood research projects and developments as plastics from impregnated sawdust, chemical bending and seasoning of wood, molded products, production of ethyl alcohol and other chemicals from so-called "waste" wood, dowels for furniture and tests of flat timber trusses under long-time loading. Published to stimulate further interest in wood research, book will be widely distributed among industrial executives, plant superintendents, engineers, chemists and architects.

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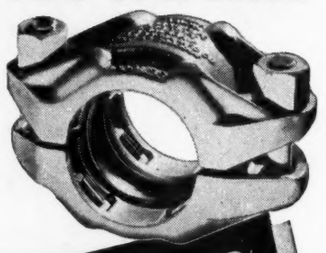
CORROSION-RESISTANT CONCRETE—**The Atlas Lumnite Cement Co.,** 135 E. 42nd St., New York 17, N. Y. (16 pp., illustrated) Concrete floors, drains and machinery foundations which will resist the corrosive action of dairy and meat packing plant wastes are described in this booklet with illustrations showing floors of this type which have been in service for ten years or more. Question-and-answer section gives information concerning the nature and use of calcium-aluminate cement and the characteristics of corrosion-resistant concrete.

Detailed information on aggregates, proportion of mix and methods of placing Lumnite concrete is included. Mortar joints for tile floors and plaster coats for walls and tanks also are discussed. For maintenance work, corrosion resistant concrete made with calcium-aluminate cement has the added advantage of gaining full working strength within 24 hr. of placing.

For Aqueducts Dams Subways

AND OTHER CONSTRUCTION PROJECTS

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PRESSURE AND VACUUM LINES

SURFACE OR BURIED

PERMANENT OR TEMPORARY

Wherever fuel, water or air must be carried in pipes on construction projects, lines can be speedily laid with Rolagrip Pipe Couplings. Anchoring lines is unnecessary, no threads or grooves are required—just plain end pipe—and it can be light-walled. Flexibility in Rolagrips automatically takes care of contraction and expansion and provides for vibration and considerable angular misalignment. Both pipe and couplings are readily salvaged for other jobs. Write for complete information.

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ARMY E NAVY

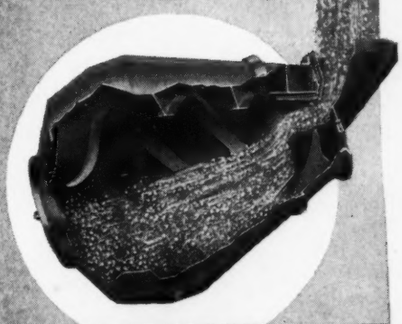
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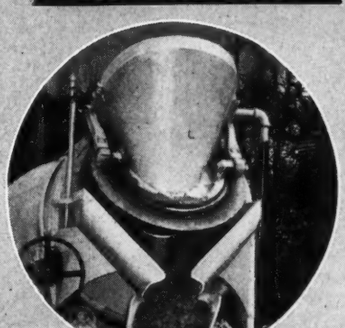
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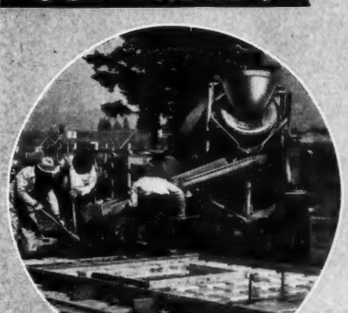
Save HOURS on Every Concrete Job with SMITH-MOBILE



IN FASTER



OUT FASTER



IN THE FORMS FASTER

Time is money! SMITH-MOBILE delivers more loads of uniformly mixed concrete per day than any other truck mixer on the market. Here's why —

FASTER CHARGING — Operator stays in cab. No hatch to open, clean and close again. Aggregates drop vertically into big, roomy feed chute and continue by gravity at high velocity toward opposite end of drum. No shafts or rods to clog up chute. Fastest loading cycle on the market.

FASTER MIXING — Drum rotates during charging operation. Shrinking and mixing start the instant a batch enters drum. This means faster and better mixing, also increased drum capacity. And while mixing, you can look into drum and SEE what's going on. No inspection delays.

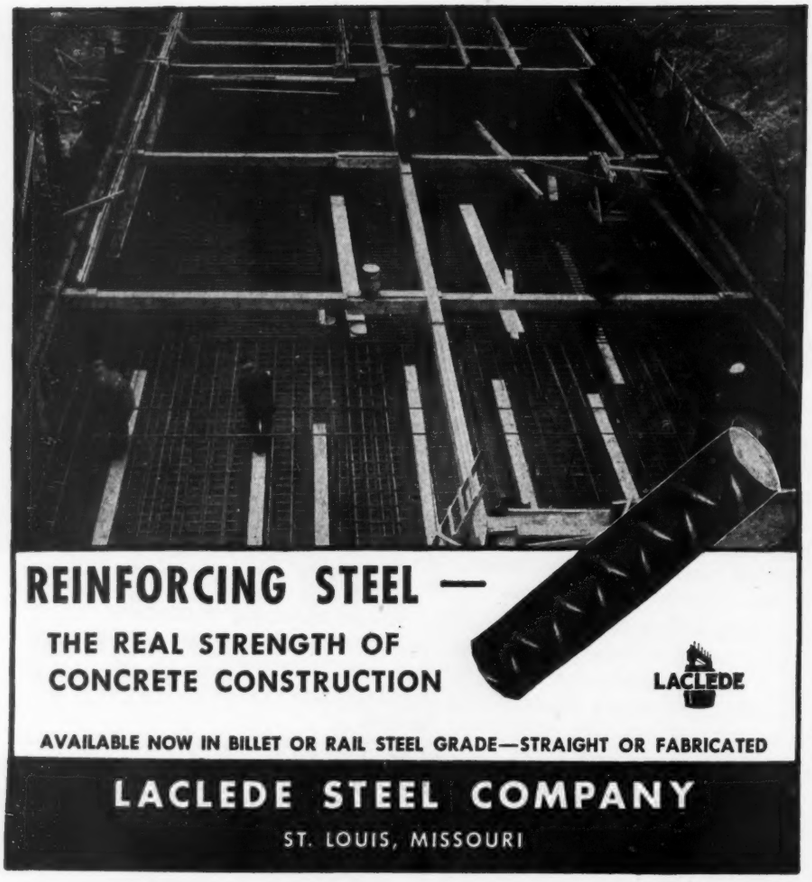
FASTER DISCHARGE—Open sealing door as far as you wish, and reverse rotation of drum. Instantly the uniformly mixed concrete is discharged by gravity . . . as fast or slow as you want it . . . any quantity you desire. The speed of the drum controls the speed of discharge.

FASTER DISTRIBUTION — Smith-Mobile's high discharge permits steeper and longer distributing spout. Eliminates need for hoist or ramp, yet provides maximum radius of distribution. Even dry concrete can be poured directly into high forms, without pushing concrete down chute. More time saved!

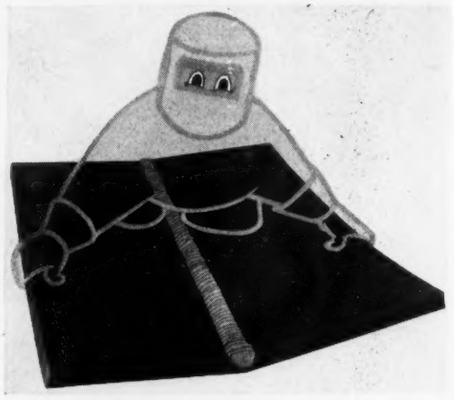
Yes sir — SMITH-MOBILE is faster all the way. It will pay you to investigate. Write for Catalog No. 198-C.

THE T. L. SMITH COMPANY
2851 N. 32nd Street, Milwaukee 10, Wis., U. S. A.

The Original High Discharge
TRUCK MIXER and AGITATOR!



SOUND COLOR MOTION PICTURE, named "Prevention and Control of Distortion in Arc Welding" and produced by Walt Disney Productions, is designed to show why metals expand and contract when they are heated and cooled and how to prevent and control distortion. To make real cause of distortion easily understood, effect of heat on an ordinary steel bar is portrayed showing just what causes bar to expand, contract and warp. Movie then points out how distortion can be prevented in any product or structure by the application of three simple rules. The villain of the picture is



"Mr. Shrink" who causes a great deal of trouble, but is thwarted at every turn and is even unknowingly put to work to overcome distortion in several cases. The three simple rules demonstrated in the film are: (1) Reduce effective shrinking force. Do not overweld. Use proper edge preparation and fit-up. Use few passes. Place welds near neutral axis. Use intermittent welds. Use back-step welding methods; (2) Make shrinkage forces work to minimize distortion. Locate parts out of position. Space parts to allow for shrinkage. Pre-bend or pre-spring parts to be welded; (3) Balance shrinkage forces with other forces. Use proper welding sequence which places weld metal at different points about structure so that as one section of metal shrinks, it will counteract shrinkage force of previous welds. Peen weld bead. Use jigs and fixtures to hold work rigid while welding. The 16-mm. film was produced for schools, colleges, technical societies, factories, shipyards and industrial groups. Running time 20 min. Available without cost except transportation upon request to **The Lincoln Electric Co., 12818 Coit Road, Cleveland 1, Ohio.**

Keeping Asphalt from Sticking to Walls Of Paving Equipment

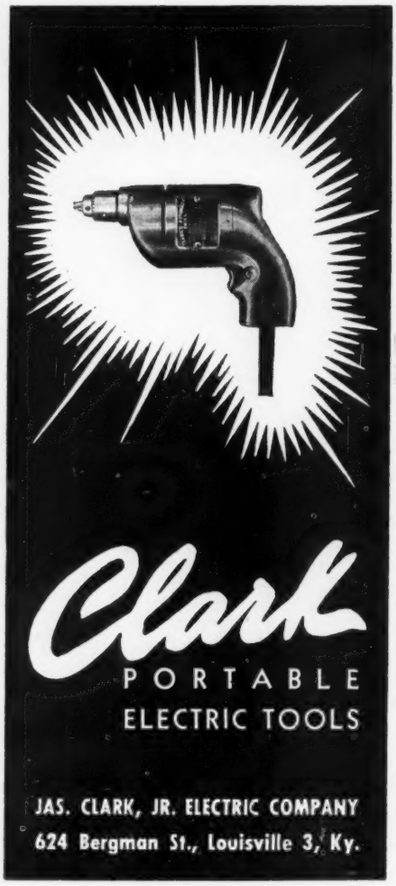
Looking for an easy, inexpensive way to prevent asphalt from sticking to your paving equipment? Then you'll surely be interested in this NEW, time-saving Oakite method!

By simply brushing side-walls, dump, agitator, cutter bar and other contact surfaces with a specially designed Oakite material . . . asphalt or other deposits CANNOT adhere to surfaces. Instead of laborious chipping or scraping after the day's run, merely hose-rinse. We'll be glad to supply you with full details. Or, if you wish, the free services of our Technical Representative are always available. Investigate TODAY!

OAKITE PRODUCTS, INC.
24G Thames St., New York 6, N. Y.

Technical Service Representatives Located in All principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING



★ ★ ★

Time Study

(Continued from page 85)

min. 15 sec., or a saving of 40 seconds.

On a conservative estimate, the total time saved by the foregoing improvements adds up to 3 min. 40 sec., reducing the cycle per truckload, to 15 min. 39 sec.

Summary

If we can cut the cycle per truckload from 19 min. 19 sec. to 15 min. 39 sec. (15.56 min.), we will get 3.84 batches per

(Continued on page 156)

Snap-on Wrenches

For Efficient Maintenance

Time and manpower saved on every maintenance operation counts today as never before! For hundreds of routine maintenance jobs such as this, modern Snap-on wrench equipment provides speed, flexibility and accessibility, with safe, powerful leverage to turn the biggest, tightest nuts.

In Snap-on's heavy duty Loxocket wrenches the automatic locking device makes any combination of handles and sockets *safe as a one-piece wrench* . . . and the fast thumb button release permits immediate change of hookup to clear obstructions. The ratchet action operates within a 20-degree handle swing.

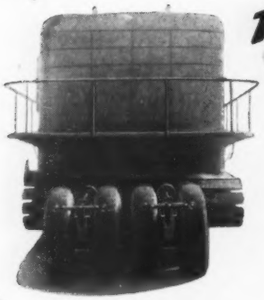
Standard Snap-on socket wrenches for industrial nut turning are available in complete series of handles and sockets in 1/4", 3/8", 1/2", 3/4", 1", and 1 1/2" square drives, with wrench sizes ranging from 3/16" up to 3 1/2". Write for 1945 catalog of 3,000 Snap-on tools for production, assembly and maintenance.

SNAP-ON TOOLS CORPORATION
8084-F 28th Avenue • Kenosha, Wisconsin



Snap-on offers right-at-hand tool service on a nation-wide basis . . . operating through factory branches located in key production centers. Write for address of your nearest branch.

A Thoroughly Proven Type of ROGERS HEAVY DUTY TRAILERS gains wider acceptance



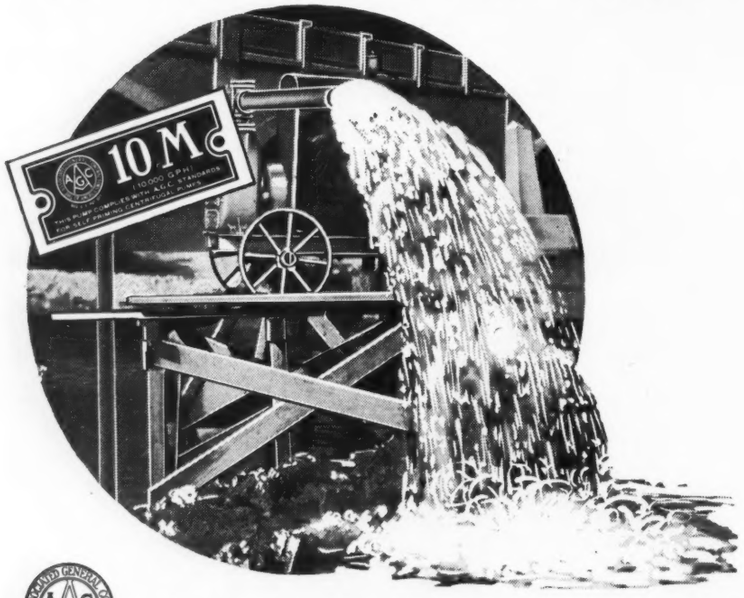
MANY riggers and contractors are solving low headroom problems with this distinctive Rogers Girder Type Trailer. Road clearance is reduced to a minimum — loading and unloading are simplified — and loads move under bridges and low obstructions that would otherwise necessitate long detours and costly delays.



ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE builds 'em — PERFORMANCE sells 'em

SEAL OF SATISFACTION



You can be sure of satisfactory pump performance by choosing a pump carrying the AGC rating plate. It is your assurance that the pump will deliver full rated capacity.

CONTRACTORS PUMP BUREAU

BARNES MANUFACTURING CO. Mansfield, Ohio
CHAIN BELT COMPANY Milwaukee, Wis.
JAEGER MACHINE CO. Columbus, Ohio
C. H. & E. MANUFACTURING CO. Milwaukee, Wis.
CONSTRUCTION MACHINERY CO. Waterloo, Iowa
MARLOW PUMPS Ridgewood, N. J.
Affiliated with
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.
STERLING MACHINERY CORP. Kansas City, Mo.
CARVER PUMP CO. Muscatine, Iowa
THE GORMAN-RUPP CO. Mansfield, Ohio
NOVO ENGINE CO. Lansing, Mich.

(*Continued from page 154*)

hr. per truck, or a total per hour of 11.52 batches, which at the current yield gives 13.3 cu.yd.

General Notes

From the record of truck cycles, it appears that the driver of Truck No. 7 was consistently slow. The spread between his average and the average of the other two drivers was 1 min. 5 sec. At least 1 min. should be saved on each hauling cycle (item 3 plus item 6).

Increased production which may be anticipated as a result of the improvements can be handled by the crane without difficulty. Trucks will deliver a batch every 5.2 min., and a complete cycle of the bucket requires only 1.43 min. So far as the crane is concerned, it would be possible to step up production to the full capacity of the mixer, or, say, 24 batches per hr. on a 2½-min. mixing cycle, equivalent to 27.6 cu.yd. per hr. more than double our present production. Such an increase, however, would require more trucks than can be made available for the job.

An accompanying chart shows the costs per cubic yard at various expense and production rates per hour.

COSTS PER HOUR FOR CONCRETE

LABOR

Shovel operator loading batcher bin	$1.50
Batcher operator	.60
Batch truck operator	.85
Mixer man	1.25
Cement man	.45
Two men at mixer chute	.90
One shift foreman	1.25
One general foreman	1.50
Three concrete truck operators	2.55
Two men at truck hopper chute	.90
One man at bucket loading point (oiler)	.80
One crane operator	1.50
Vibrator man in forms	.60
Three dump men in forms	1.35
One placing foreman	1.50
Two cement finishers	1.85
One concrete superintendent	2.00
	$21.35
Labor burden	4.22
Total labor cost	$25.57

EQUIPMENT

Shovel loading batcher	$4.00
Four trucks (batcher and concrete)	10.00
Crane handling concrete bucket	8.50
Buckets, vibrators, tools, air, water, etc.	.93
Total equipment cost	$23.43
Overhead and general charges	6.00
Total per hour	55.00



SPLINED SHAFTS

THE illustration above shows the cutting of a spline in a LIMA vertical swing shaft. Spline cutting requires costly precision equipment. It also requires longer time to complete the job—but when finished a more accurate fit, greater strength and longer life to the part is obtained. A keyway or a square shaft, would in a fashion, serve the same purpose, but the reversing torques or repeatedly applied torque would rapidly weaken the keyed or square shaft, consequently delays and costly repair bills would result. Splines cut from the solid is standard practice with LIMA. Not only do splined shafts have greater strength, but they also assure a positive union between the driving and driven part. They also make it possible to separate the parts without damage to either part. Tomorrow when you will be buying new material handling equipment be sure it is a LIMA and get greatest value from your investment.

A good feature to have in a...
SHOVEL, CRANE or DRAGLINE

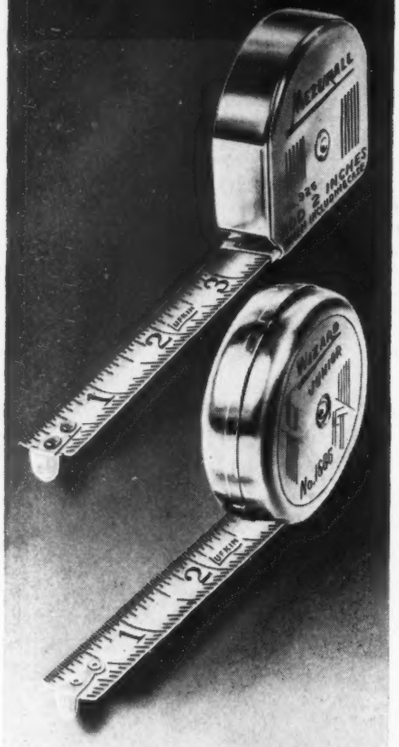
LIMA

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
LIMA, OHIO, U. S. A.

NEW YORK, N. Y. · PHILADELPHIA, PA. · NEWARK, N. J. · MEMPHIS, TENN.
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SHOVELS, ¾ YD. TO 5 YDS. CRANES, 13 TONS TO 100 TONS
DRAGLINES, VARIABLE

LUFKIN
TAPE - RULES



Those little measuring jobs that pop up many times daily may be annoying, but they're important. Treat them with the accuracy they need and with the speedy convenience you want—measure them with a Lufkin "Mezurall" or "Wizard Jr." Compact, lightweight, easily carried in the pocket, these smooth-sliding tape-rules can be projected unsupported to measure ceilings, floors, doorways, etc., yet are easily flexed around angular surfaces. Special design case of the "Mezurall" permits inside as well as outside measuring. Buy the best—buy Lufkin.

Write for free catalog.

LUFKIN
SAGINAW, MICHIGAN • New York City
TAPES • RULES • PRECISION TOOLS

Britain's Re-Housing Project

(Continued from page 61)

airfields for the RAF and USAAF. A call was sent out to all men who could be spared to return, to London. The response was immediate. By the end of June, 32,-300 were at work; by the end of July, 50,-100; by Aug. 25 the figure had risen to 60,200. Mid-February, 1945, found 132,-000 men engaged in bomb repairs, excluding 4,900 lent by the British Forces (most of whom were in the building industry before the war), and 225 greatly appreciated American soldiers. Another 1,735 Americans have been engaged on emergency hutting.

London faced further problems when the workmen arrived. They had to be housed, fed and transported to and from work in a city acutely short of accommodation, transportation and domestic help. Arrangements were made to house the men in commandeered West London hotels (they worked mostly in the east and southeast). Volunteer Scottish girls packed lunches and cooked for them. Mobile canteens, including many presented to Britain by the American Red Cross, provided cups of tea for thirsty men working in the dust of debris.

Prefabricated Houses

Thoughts in Britain are now turning to prefabricated houses. Although the average Briton prefers to stick to his own district and endure the temporary discomfort of his own home rather than be moved to a requisitioned house or a temporary hut in another part of town, many have no such alternative. Three thousand of the ten thousand corrugated asbestos Nissen huts put at the disposal of the Ministry of Works for temporary re-housing have already been erected, mostly on cleared bomb sites. Curved asbestos sheets are bolted on the exterior, while the interior is fitted with a lining of asbestos cement. Though admittedly a compromise, they are fitted with electricity and contain many labor-saving devices, and the first people to live in them are satisfied.

The British Government at present plans to erect 145,000 prefabricated houses. The vanguard of these, including the prototype of the 30,000 units being supplied by the United States, have already been set up, and many Britons are now living in homes which will be theirs for from 2 to 10 yr. The Government

(Continued on page 160)

ON-THE-SPOT MIXING
with a JOHNSON
PORTO-BATCHER



Mix Where Needed . . .
Saves Time, Tires and Labor

Johnson's Porto-Batcher is a complete, *portable* highway batching plant that provides fast, thorough on-the-spot mixing for many types of jobs — *wherever located.* It's compact, tows easily, erects quickly and meets all state highway requirements. *In addition to pavement work* PORTO-BATCHERS *are used as follows:*

- As an auxiliary to a large ready-mix plant on large buildings, or bridge jobs, where distance from the main plant is a factor.
- By ready-mix operators who do not have a suitable site for a larger plant or who lack an established market for ready-mixed concrete in smaller communities.
- By general contractors who have a source of aggregate in construction of bridges, buildings and other concrete structures.
- By gravel producers interested in furnishing ready-mixed concrete for odd jobs or renting the machine to general contractors (along with the sale of aggregate).
- By road contractors who have occasional small street jobs or highway patching contracts.

Ready Mix Plant
Bulk Cement Handling Equipment
Cement Storage Bins
Concrete Buckets
Batchers

THE C.S.JOHNSON COMPANY
Champaign, Illinois
A KOEHRING SUBSIDIARY

Q Is it too Early to get Ready for the Coming Competition?



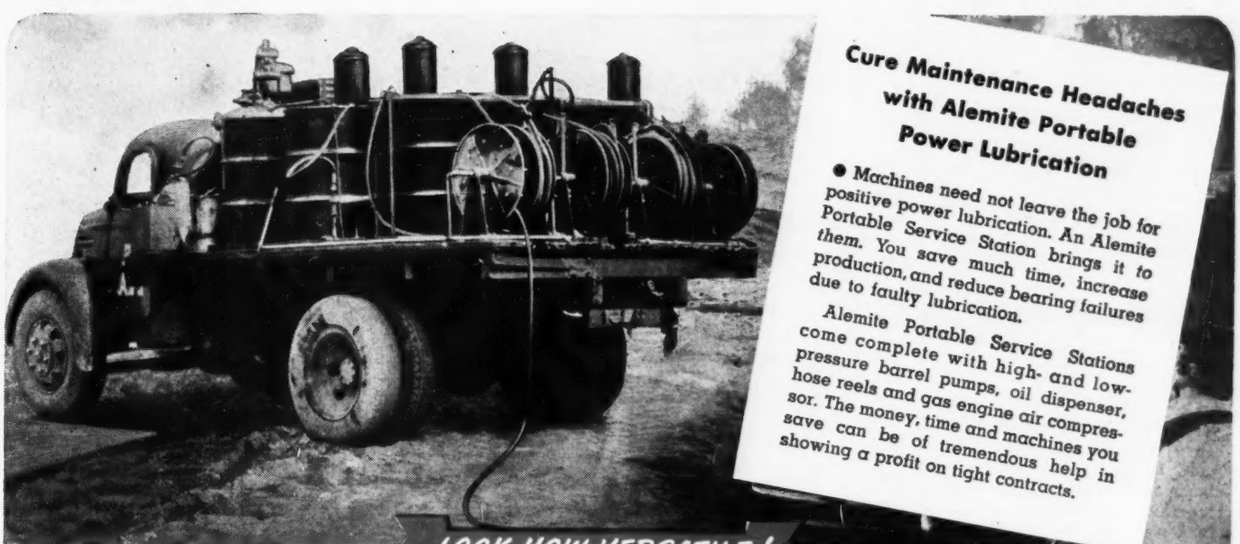
A Decidedly not! You can make sure *now* that your machines will produce more work, have less "down time," cost less to maintain. For instance, a contractor got results like these using an Alemite Portable Service Station: on 5 *machines alone,* lubricating time was cut 50%—gaining 100 minutes "M.P.T."* per day. Bearing failures were sharply cut. Consumption of lubricants was greatly reduced. Savings in time, maintenance and machines soon paid for the new method. Checked your lubrication methods lately?

***More Productive Time*



Q Can failure of parts rob you of "M.P.T."?*

A You bet they can! When a part goes, you're saddled with costly "down time." You're robbed of the full productive time of the machine. You can do as one contractor did —with Alemite Portable Service Stations he cut "cat" track roller wear 33%—kept his machines on the job longer between overhauls. What's more, he reduced his lubrication time by 75% over hand lubrication, leaving more time for work. Sound good to you?



Cure Maintenance Headaches with Alemite Portable Power Lubrication

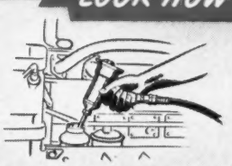
● Machines need not leave the job for positive power lubrication. An Alemite Portable Service Station brings it to them. You save much time, increase production, and reduce bearing failures due to faulty lubrication.

Alemite Portable Service Stations come complete with high- and low-pressure barrel pumps, oil dispenser, hose reels and gas engine air compressor. The money, time and machines you save can be of tremendous help in showing a profit on tight contracts.

LOOK HOW VERSATILE!



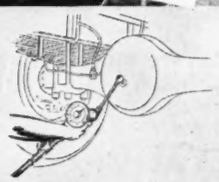
Fast, easy lubrication of track rolls and all bearings having pressure gun fittings.



No time or oil wasted in filling crank cases, or other oil containers, with the amounts desired.



Air line equipment for tire inflation, air jet cleanings, engine cleaning, paint spraying, etc.



Quick and precise dispensing of gear lubricants to gear housings, transmissions, final drives, etc.

FREE! Illustrated catalog describing Alemite Portable Service Stations. Also, complete catalog of individual Alemite lubricating equipment. Send coupon for your copies.

ALEMITE

First in Modern Lubrication

CONSULTATION • ENGINEERING • EQUIPMENT
LUBRICANTS • MAINTENANCE

Another Product of STEWART WARNER

ALEMITE, 1840 Diversey Parkway, Chicago 14, Illinois
In Canada: Belleville, Ontario.

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☐ ALEMITE PORTABLE SERVICE STATIONS
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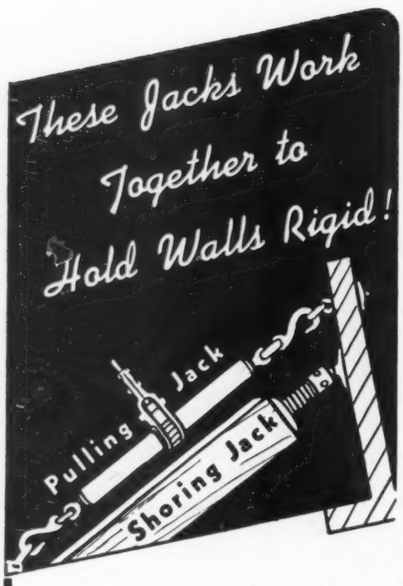
(Continued from page 158)

hopes that permanent houses will be available to take the place of the prefabricated ones by the end of a decade. As a beginning, it is planned that 220,000 permanent houses will be built within 2 yr. of Germany's defeat, with 80,000 more nearing completion by that time.

First among the prefabricated dwellings was the famous Portal house, containing living room, kitchen, two bedrooms, bathroom, lavatory and shed—all contained in an area of 616 sq. ft. within the outer walls.

Among the newer types is the Airoh aluminum house, designed by the (British) Aircraft Industries Research Organization on Housing. By far the most highly prefabricated type yet produced, the Airoh is made in four sections, each complete in itself. The sections are coupled by interlocking fastenings within a few hours, and when services have been joined up and loose furniture moved in, the house is ready for occupation. The size of each section (22 ft. 5½ in. long, 10 ft. 8½ in. high and 7 ft. 6 in. wide) was determined by balancing the considerations of erection—speed of construction and minimum consumption of

(Continued on page 162)



In construction or wrecking, walls, towers, stacks—vertical structures can be held rigid and secure by using Simplex Shoring Jacks to push and Simplex Pulling Jacks to pull against them, as shown in the sketch.



Ratchet Pulling Jacks

Save time and cut costs on coffer dams, concrete and steel construction requiring false work or framing. 8 and 15-tons capacity. Also available with lock-link hook ends.



Push and Pull Jacks

These powerful jacks are widely used in the erection of bridges, tanks and forms; and for pulling together or pushing apart structural members. No. 1524 (shown), 15-tons capacity. Other models 8 and 10-tons.

Shoring Jacks

Provide widest margin of safety in shoring work, timbering and for use as temporary columns and other construction work. 25 and 35-ton capacities.



Templeton, Kenly & Co.
Chicago (44) Ill.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

C.H.&E.

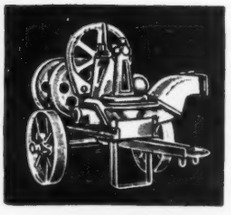


SAW RIGS

4 sizes—ripping capacity 2" to 6" lumber—gasoline engine or motor drive.

PUMPS

Diaphragm, Self-Priming Centrifugal Piston & Jetting Pumps

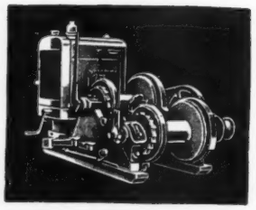


Also 3-Ton Road Roller

HOISTS

5 sizes — from 800# to 7000# lifting capacity — gasoline engine or motor drive.

Write for catalog



C. H. & E. Manufacturing Co.
3847 No. Palmer St. Milwaukee 12, Wis.

CONCRETE PIER FORMS
made and priced for
ONE TIME USE



Sonotube
Laminated Fibre Tubing

To Save Time—Money—Labor—Lumber

Practical up to 10 feet for piers.
Practical up to 14 feet for columns.

Immediate Delivery in 6 Standard Sizes

INSIDE DIAMETER					
8"	9"	10"	11¼"	12"	13½"
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller sizes available.

WRITE FOR DELIVERED PRICES

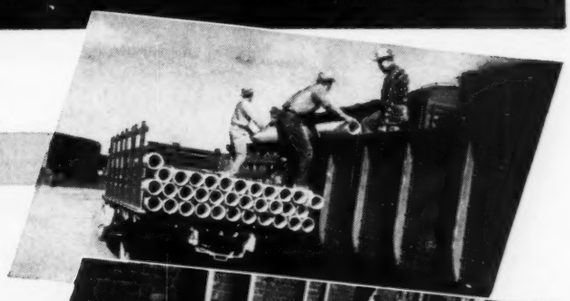
ARMY E NAVY

SONOCO PRODUCTS COMPANY
HARTSVILLE, S. C. MYSTIC, CONN.
ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS.



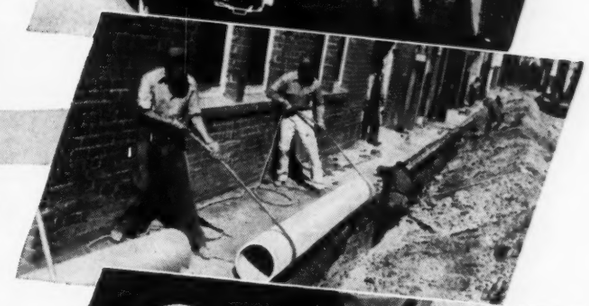
1. BIGGER TRUCK LOADS

Right from the start, easy-to-handle Transite Pipe begins to pay off. Its light weight means more footage carried per truck load . . . lower transportation costs.



2. SMALLER CREWS

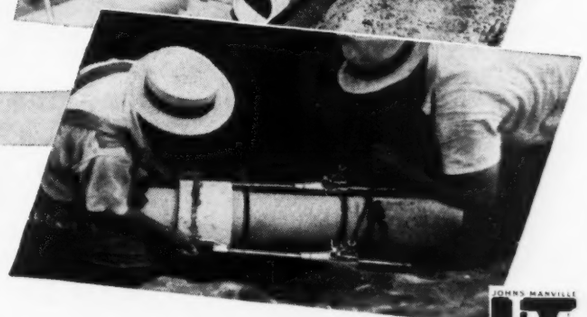
On the job, it takes fewer men to handle Transite Pipe, and smaller installation crews mean lower installation costs. Mechanical handling equipment is not necessary except for the larger sizes.



3. FASTER ASSEMBLY

In the trench, Transite Pipe is assembled easily, quickly, even by unskilled crews. Its exclusive Simplex Coupling assures tight joints, even when the line is deflected as much as 5° at each joint.

And in service, Transite Pipe pays off in efficient, dependable water transportation. Made of asbestos and cement, this non-metallic pipe is immune to tuberculation, highly resistant to soil corrosion. Its low maintenance has been proved in thousands of installations.



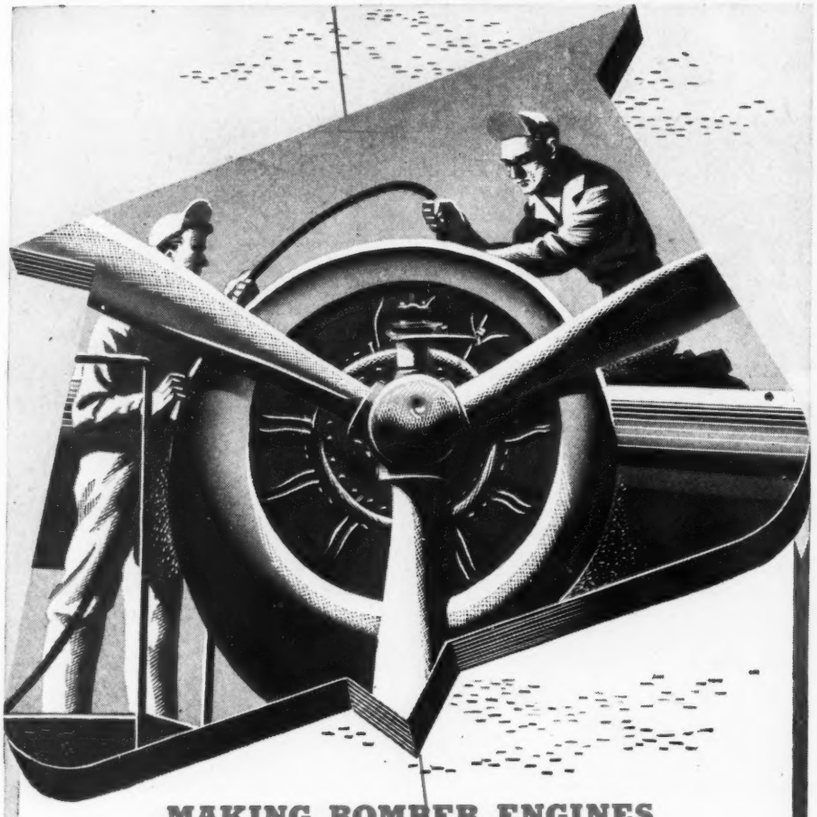
Johns-Manville

22 EAST 40TH STREET, NEW YORK 16, N. Y.

JOHNS MANVILLE JM PRODUCTS

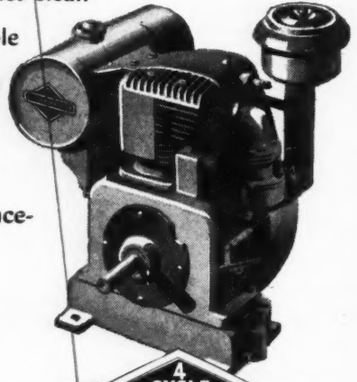
TRANSITE PIPE

FOR EFFICIENT, ECONOMICAL WATER TRANSPORTATION



MAKING BOMBER ENGINES
"Come Clean"

To help keep huge bomber engines clean and free of dust and dirt, portable compressed air units are used—powered by these dependable *air-cooled* gasoline engines. One more vital war job for performance-proved Briggs & Stratton air-cooled gasoline engines.



Air-Cooled Power

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

Their trouble-free performance, easy starting and economy have made Briggs & Stratton engines leaders in the field —"preferred power" everywhere. Only in Briggs & Stratton AIR-COOLED POWER can you get the superior performance made possible by the "know-how" gained through 25 years of continuous production, and consistent leadership in design, engineering, and precision manufacture. BRIGGS & STRATTON CORP, Milwaukee 1, Wisconsin, U. S. A.

ARMY E NAVY

(Continued from page 160)

site man-hours—with the requirements of the transport regulations.

The floor frame is made in aluminum alloy faced with normal timber floor boards. The walls are faced externally with alloy sheet painted with a rough cast finish of stone appearance, and internally with plaster board and spray-painted in color. The wall filling is a lightweight aerated cement which has a high insulation value. The roof is faced externally with aluminum alloy sheet packed with cork, which gives thermal insulation and eliminates drumming. There is a high standard of thermal and sound insulation throughout—both in the exterior structure and internal partition. In these respects the structure should be better than the standard 9 in. brick wall, and the roof better than tiles and roof felt.

Chief advantage of aluminum alloys for prefabricated house construction, of course, is their lightweight for transport and handling. In addition, they can be subjected to tremendous strain and weather conditions.

Three Types of Dwellings

Britain has also started production on three other types of prefabricated dwellings: the Uniseco Emergency Hut, the Arcon house and the Tarran house, all made of steel. Two new Ministry of Works two-story, wood-and-brick houses have also been considered. These, though not so highly prefabricated as the steel or aluminum houses, show a high degree of prefabrication, and their large-scale production is limited primarily by the amount of wood working capacity which can be made available.

The house lend-leased by the United States is timber-framed, measuring 24 ft. 2½ in. x 24 ft. 2½ in. with an extension or wing projecting 4 ft. 1¼ in. at one side to give an overall frontage of 28 ft. 3¾ in. and a total inside floor area of 600 sq. ft. It is also a single-story building, with a flat roof, no basement, containing a living room, two bedrooms, kitchen and bathroom. A built-in larder, with louvers for ventilation from the outside, will serve in place of a refrigerator or ice box. Plumbing and plumbing fixtures will be shipped with the structure, while wiring, heating and other equipment will be installed in Britain. Deliveries were scheduled to start in May, 1945, and all houses should be delivered from the U. S. by early 1946.

It is estimated that the aluminum house will cost about $3,600, while the others are priced between $2,400 and $3,200. About $400 worth of fittings—cupboards, stove, refrigerator, etc.—will go with each house. Where the materials interfere with radio reception, a special aerial will be supplied.



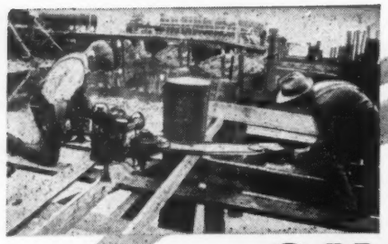
Prolonged production of wartime necessities has placed a strenuous test on civilian equipment. Replacements are hard to get nowadays . . . impossible in some cases. It takes superb equipment, properly serviced, to successfully bridge the gap between prewar and postwar supplies. Gar Wood equipment is well known for its ability to deliver rugged, dependable day-in, day-out performance. That reputation was not easily won. Present-day owners of Gar Wood equipment know that it was designed and built to last a long time . . . to get work done quickly and efficiently without babying and constant attention.

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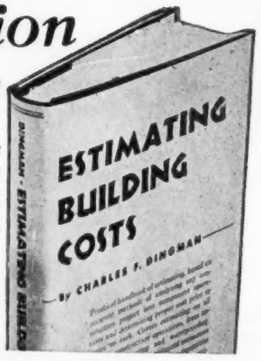
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ARMY E NAVY

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Just Published — Third Edition

ESTIMATING BUILDING COSTS

By CHARLES F. DINGMAN
Architectural Engineer

401 pages, 4 x 6¾, 27 illustrations, $3.00

This practical guidebook of estimating trains the estimator to analyze every construction job into its component parts to apply cost data, adjusted to living conditions, to the several operations necessary, and to calculate a price that will approach the actual cost of doing the work as closely as is humanly possible.

ESTIMATING BUILDING COSTS tells how to make an estimate on a wood, brick, or concrete building construction, and covers every operation from excavating to roofing and waterproofing —with valuable material on such important details as fireproof construction, shingling, steel sash, or cement gun work. Included also are a number of useful data tables, but its primary purpose is to give the step by-step methods that will train the reader to become a thoroughly competent estimator. This book helps you to make sure that no element of the work is overlooked, and explains the special factors to watch in dealing with each type of work.

While essentially a book of methods, ESTIMATING BUILDING COSTS contains 227 data tables and other useful reference features for the estimator, such as a reminder list of job elements, and a number of practical mathematical formulas.

Practical features

- Covers earth handling and moving so fully that the data are applicable to building operations of practically any scope and size, also to other construction operations involving this work
- Contains extensively rewritten and expanded sections on handling and finishing concrete
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War-Damaged Railroads

(Continued from page 77)

and Luxembourg. This includes all major rail networks in Allied territory. They have also made temporary repairs to 240 railroad bridges which had been destroyed by enemy demolition or our bombing. They are at work on many others at the moment. Some of this work is done under fire or involves other unusual difficulties. A platoon of Co. B, the 347th Engineer General Service Regiment, working on one structure recently, shot down with small arms fire a German Me 109 plane which crashed about ½-mi. away. This tends to add interest to the work.

By far the most difficult single railroad job yet encountered is the bridging of the Rhine. (Described elsewhere in this issue.) The Rhine has been bridged before in military operations for road purposes, but never for railroads. Caesar built a pile bridge across the Rhine near Coblenz. Louis XIV, in 1672, in his campaign against the Dutch, swam the horses of his cavalry across near Tolhuys and then built a ponton bridge to get other troops over. Marshal de Crequy in 1678 crossed the Rhine near Neu-Brisach and took Friburg by storm, crossing by a ponton bridge. But all of these were minor operations in comparison with the current crossings now effected by the U.S. Army Engineers.

★ ★ ★

Rolled Concrete

(Continued from page 88)

and concern by scaling and disintegrating. The district office is of the opinion that use of the new concrete apron by heavy construction equipment on the day after the pavement had been laid was responsible for subsequent disintegration of a portion of the concrete. The disintegration generally was along the lane used by the heavy construction equipment.

Accompanying photographs indicate the construction of the flight hangar apron at Buffalo and the tie-down anchors installed in the concrete.

WHY A CUMMINS DIESEL ?..

In making a decision on the diesel you'll want for your heavy-duty earth moving and material handling equipment, consider *all* the "angles" . . . the men who build it . . . use it . . . service it.

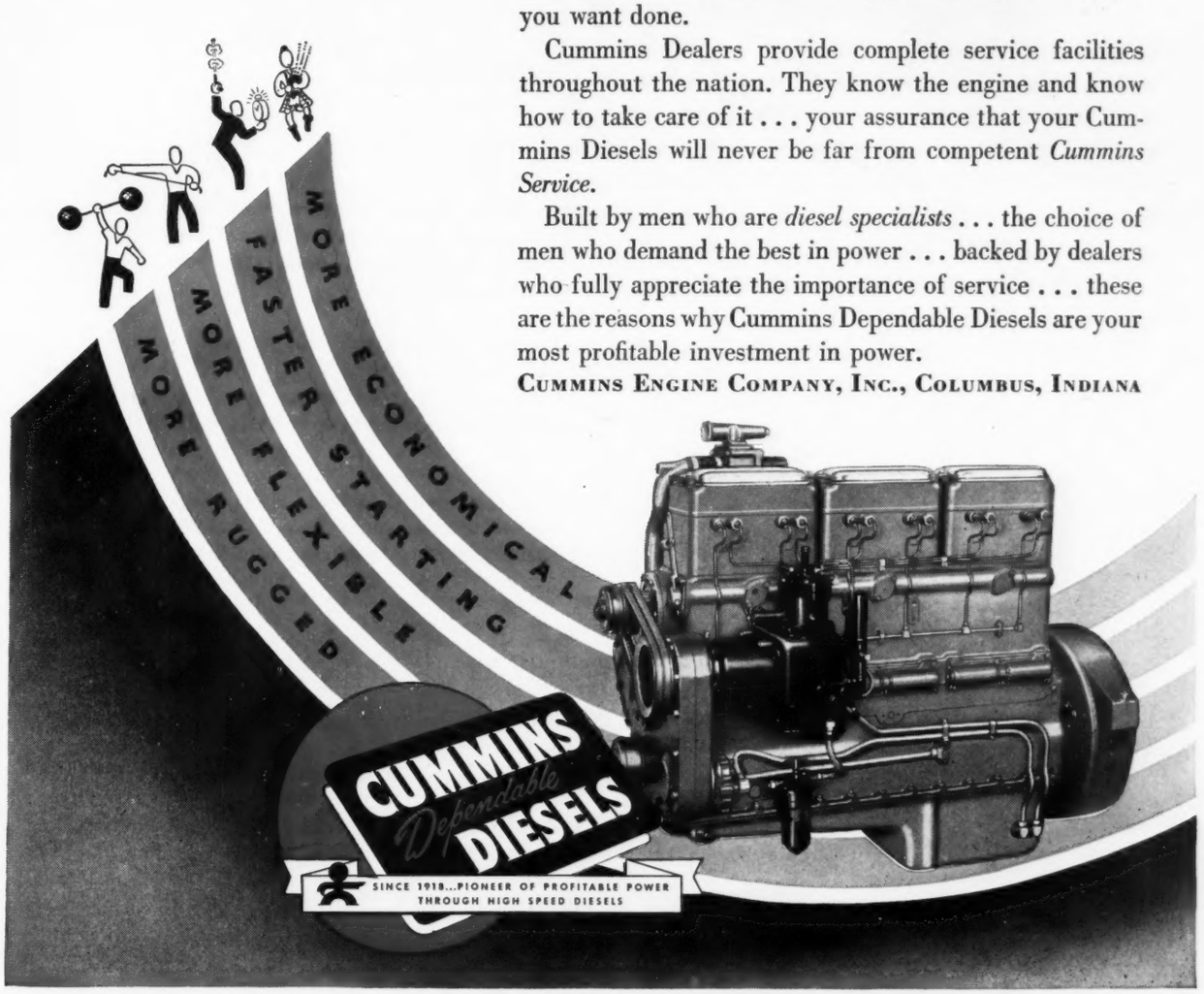
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Here are just a few of the many uses you'll find for Athey Force-Feed Loaders in handling surplus material on maintenance work: Ditch cleaning, Road grading, widening and straightening, building and relocating ditches, and dressing slopes.

You'll save time and manpower . . . do more work . . . by replacing hand or other slow and expensive methods, with Athey Force-Feed Loaders. Ask your Athey-"Caterpillar" dealer for complete details, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

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H. M. Thompson & Co.	Oil Field	52,520
Baregar Bros.	Farming	45,000
E. C. Von Glahn	Farming	38,000
Frank Colt	Farming	36,000
R. M. Jensen	Contracting	33,960
R. M. Jensen	Contracting	32,880
Oahu Sugar Co.	Farming	32,000
Hawaiian Pineapple Co.	Farming	31,017
D. A. Kessler Constr. Co.	Contracting	31,000
Gilbert Courtright	Farming	30,000
W. D. Annis	Contracting	30,000
ENGINES		
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Denwood Oil Co	Industrial	60,000
Rosenthal & Carter	Oil Field	46,525
Mt. Emily Lumber Co.	Logging	43,000
Fairview Lt. & Power Co.	Industrial	35,000
Capparell Stripping & Construction Co.	Mining	33,600
Belton Hatchery	Industrial	32,272
S. A. Murphy	Oil Field	30,240
M. DeRome	Contracting	28,000
W. E. Johnson	Industrial	26,616
Bridgeport Oil Co.	Oil Field	26,320
M. O. Weaver, Inc.	Contracting	25,600
Massaponax Sand & Gravel Co.	Industrial	25,000

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WRITE FOR BULLETIN MC-106, *showing many successful applications of Mines Connectors throughout industry.*

MINES EQUIPMENT COMPANY

4245 Clayton Avenue
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Tractor-Mounted Spreader

(Continued from page 79)

trench is a metal chute through which the material is discharged. Flow of the mixture in the chute is controlled by the speed of the screw conveyor. At the bottom of the chute is a leveler arm, set by a hand lever, for striking off the material and controlling depth of spread. The length of the spreader permits loading from a dump truck operating on the existing road. To discharge its load, a truck backs up to the spreader, the body is raised to dumping position, and, with the transmission in neutral, the truck is pushed ahead by the tractor as the load is transferred. Immediately following the placing of each 3-in. course, a three-wheel Galion 2½-ton trench roller, with one 20-in. and one 10-in. wheel in the trench, compacted the fresh material. This equipment laid 3,000 ft. of 27-in. widening strip per day.

The project was in the Seymour district and was under direct supervision of Edward Cole, inspector for the Indiana State Highway Department. Eugene Berkey was superintendent in charge for the Middle West Roads Co., contractor, Noblesville, Ind.

★ ★ ★

Contractor Fabricates Equipment

(Continued from page 66)

chines, of which the contractor had four Cleveland wheel type and one Buckeye ladder type, and the sections that caved were cleaned out with truck cranes. When the pipe was ready, it was lifted and lowered into the trench by tractors with side-mounted booms, usually working in pairs about 100 ft. apart.

Backfilling was done with bulldozers

(Continued on page 172)

Look for the Arm-and-Hammer

ARMSTRONG BROS.

BETTER PIPE TOOLS



Threads of Lathe-cut Smoothness

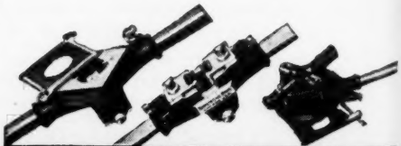
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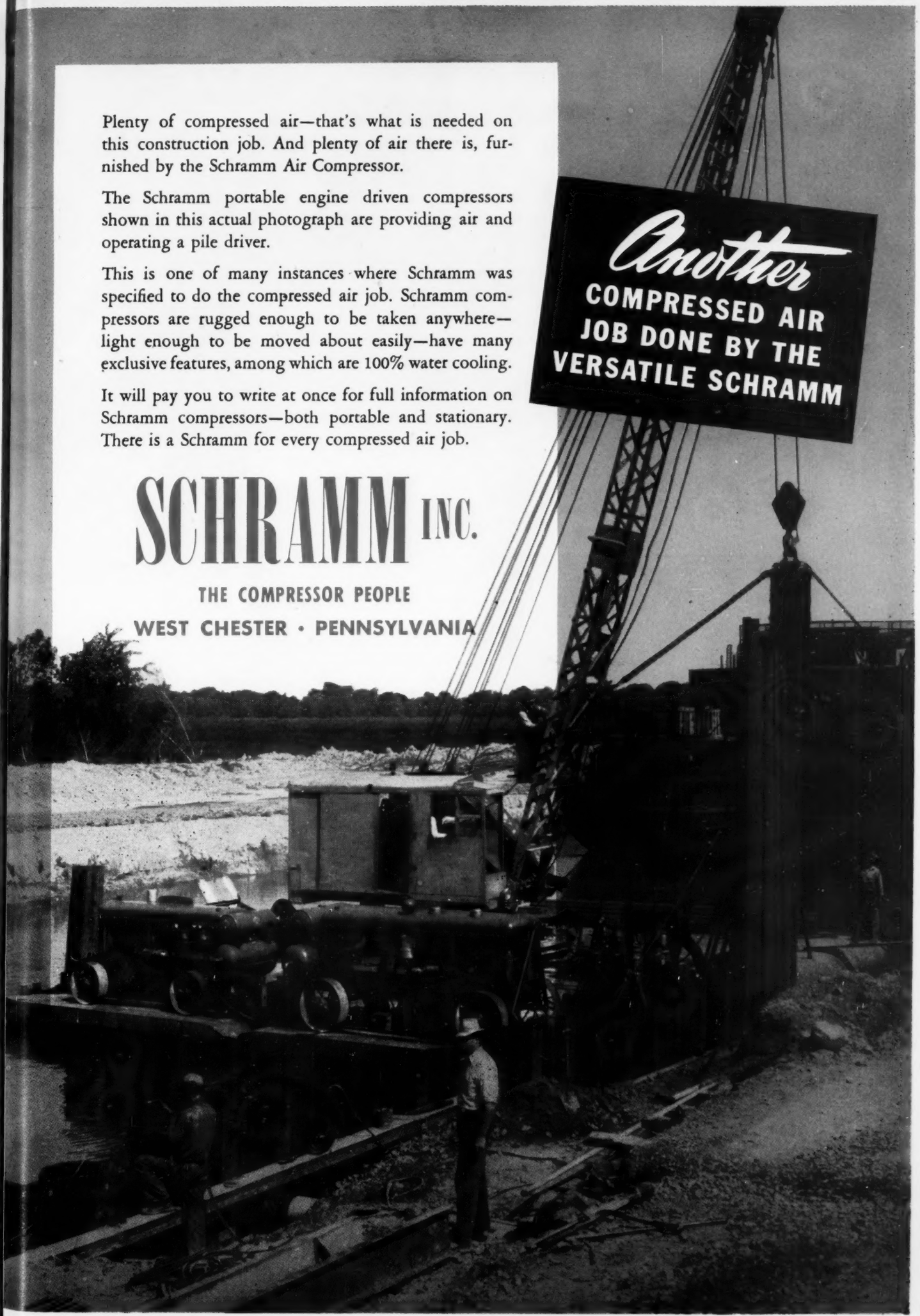


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The Schramm portable engine driven compressors shown in this actual photograph are providing air and operating a pile driver.

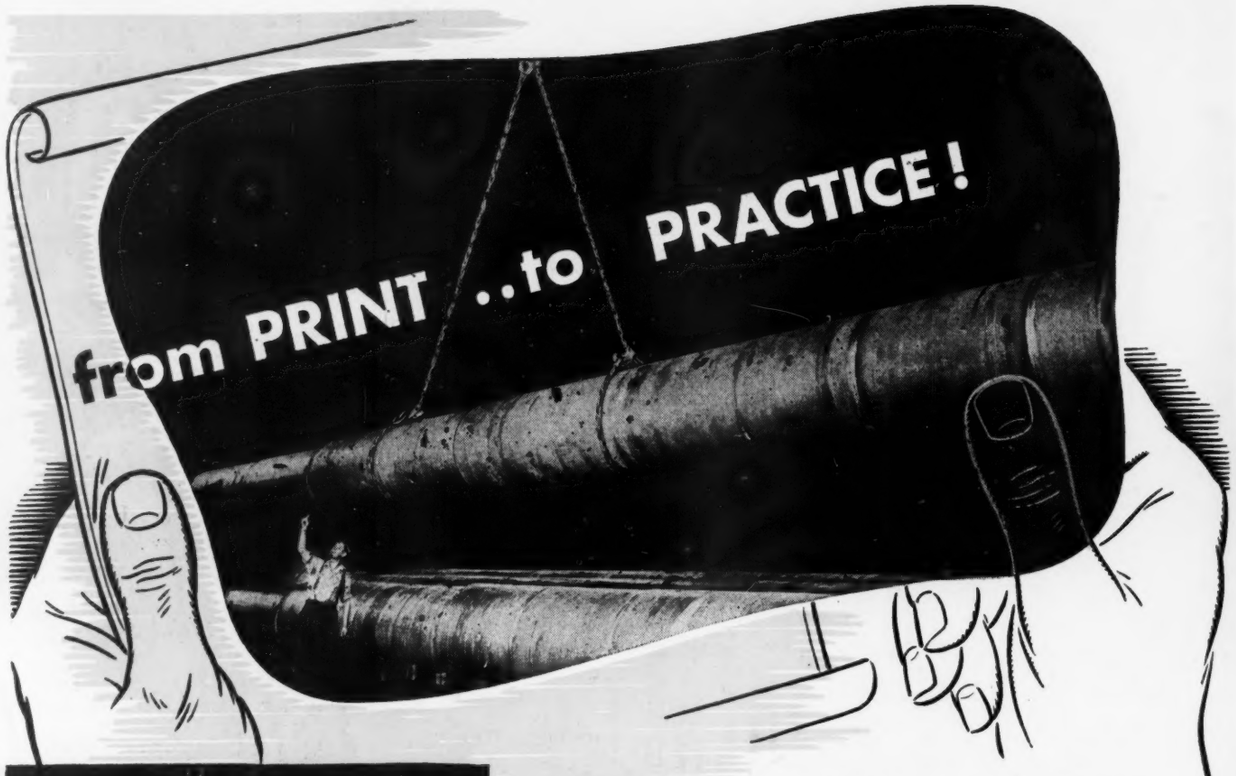
This is one of many instances where Schramm was specified to do the compressed air job. Schramm compressors are rugged enough to be taken anywhere—light enough to be moved about easily—have many exclusive features, among which are 100% water cooling.

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Send details of your application now and let B & B engineers offer a recommendation. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

ARMY E NAVY

BRODERICK & BASCOM
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THIS is the modern, profitable way to put down rock on highways and airports. Well over 100 tons an hour is an easy average with an Adnun while some owners report 190 tons per hour possible output. Of equal importance, is the fact that the rock is laid right to specifications, even courses free from voids and irregularities, accurate to a small fraction of an inch. No material is wasted and there's no need for raking or excessive hand labor.

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THE WELLMAN ENGINEERING CO.
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(Continued from page 168)

or bladers. Along state highways it was required that the backfill be air-tamped in layers 4 in. thick. To accomplish the same result with much less labor, as made necessary by a critical manpower shortage, the contractor built a special sheepsfoot roller. The sheepsfeet were welded on a cylinder 24 in. wide and 66 in. in diameter, weighing about 4,000 lb. There were 120 heads spaced at 9-in. centers. The tamping roller was rigged to be slung from a side crane on a tractor that moved back and forth along the trench.

Unsupported Canyon Spans

It was found feasible to cross canyons in the mountain sections without cables or other external means of support. This plan was used successfully in a number of crossings, the longest of which has a 420-ft. span. For these spans no anchorage was used other than the embedding of pipe in the trench at either end of the suspended portion. Suspended spans were not put in until after the pipe had been laid up to both edges of the canyon. A sufficient number of pipe sections were then welded into one continuous length and pulled across the canyon by means of a cable. This cable was kept well above the level at which the pipe would be slung. When the pipe reached the far side it could be allowed to sag to its final position by slacking the supporting cable. The 16-in. pipe assumed a minimum radius of curvature of about 800 ft. After a little experience it was possible to predict the amount of bending that would be desirable in the approaching portions of the pipe in the trench to reduce bending stresses in the unsupported pipe at the points of maximum curvature.

Bending was performed by both the wrinkle bend method and with a bending machine. The latter consisted of a bending table with a winch and a bending shoe. The bending shoe supported the pipe so that the bend could be made cold. The wrinkle bend involved use of a gas torch to heat bands about 7 in. wide extending around three-quarters of the circumference on the lower side of the pipe. Softening of the metal in a band while the pipe was under bending strain caused the formation of a wrinkle and gave the pipe slight curvature. These wrinkles were put on at 20-ft. intervals.

River Crossings

It was considered advisable to put the pipe well below the river beds of the Santa Clara and Ventura Rivers. Trenches were dug in which an 8- to 20-ft. cover could be put over the pipe. By laying the pipe in the trench part way across the bed of the river and then di-

(Continued on page 174)

BOILED DOWN

TO SIMPLIFY MOTOR SELECTION



● **This new booklet gives ratings, sizes, characteristics, dimensions, where-to-use data, *and prices* of General Electric a-c and d-c motors, 1/16 to 75 hp. Everything you need to know to select these sizes—all in 16 pages!**

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Buy all the BONDS you can—*and keep all you buy*

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7M1-258-488

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that's as

EASY TO USE

as a risky one



Since Laughlin's newly-designed latch provides approximately 80% of the throat opening of ordinary hoist hooks, more and more materials handlers are swinging over to the safe side.

You, too, can add safety to efficiency by making loads jolt-proof. Investigate these rugged, drop-forged, heat-treated, standard-type hoist hooks with sturdy latches and stainless steel springs (½ to 15 ton safe load).

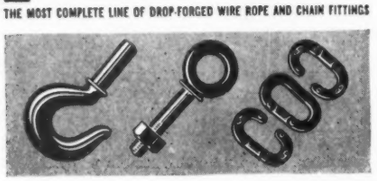
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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



(Continued from page 172)

verting stream flow over that section, the crossings were made during the low-water season without difficulty.

This pipe line was built as a joint project to make the underground storage facilities of the Pacific Lighting Corp. available to the Southern California Gas Co. and the Southern Counties Gas Co. Preliminary engineering work was done under the supervision of H. P. George, of the Southern California Gas Co., and Fred A. Hough, of the Southern Counties Gas Co.

Among the more important items of construction equipment used were:

30 pickup trucks
75 trucks, including pipe, gasoline, lubricating and skid trucks and man carriers
7 passenger cars
32 welding generators
13 tar pots (Standard Steel)
3 motor patrols
1 street sweeper (Spearwell reversible traction-boom type)
8 lighting plants
1 boring machine
2 bending machines
3 cleaning machines
2 traveling coating and wrapping machines
2 specially built coating and wrapping machines for yard coating work
2 rooters
4 water tanks
2 specially built sheepsfoot trench tampers
15 trailers (Fruehauf and Utility)
27 tractors (Caterpillar, International, Cleveland, Allis-Chalmers)
11 truck cranes (Lorain and P&H)
1 trench hoe
5 ditching machines (four Cleveland and one Buckeye)
6 air compressors (Gardner-Denver and Schramm)

★ ★ ★

Heavy Grading

(Continued from page 94)

a special braking feature of the Terra Cobras. It is easy to lower the entire bowl of these units, loaded or unloaded, so that it drags on the ground without spilling any of the contents. This gives a very effective braking control in the descent of steep grades and saves the brakes.

On this project, Al H. Johnson was general superintendent for Morrison-Knudsen, succeeding James N. Wells, who was transferred to Venezuela after the job started. Ed A. Campbell was field supervisor and assistant general superintendent.

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Investigate Blue Brutes. Try 'em—buy 'em. Nearest distributor listed on page 174

*Reg. U.S. Pat. Off.

**Blue Brute Compressors and Air Tools are painted olive-drab for the Army and battleship-gray for the Navy.

Behind the Fighting Fronts with

Blue Brutes

In today's mechanized warfare, Blue Brutes** help prepare the way — repair bridges, roads, tunnels, set up fighting positions, build landing fields. At home, in Army Camps, Navy bases, Blue Brutes are at work. They'll be ready, postwar, for the construction projects now being planned for peacetime jobs and improvements.

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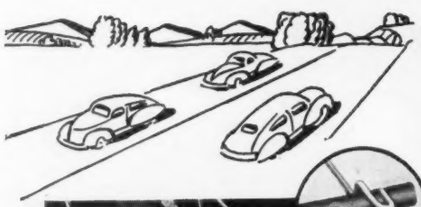


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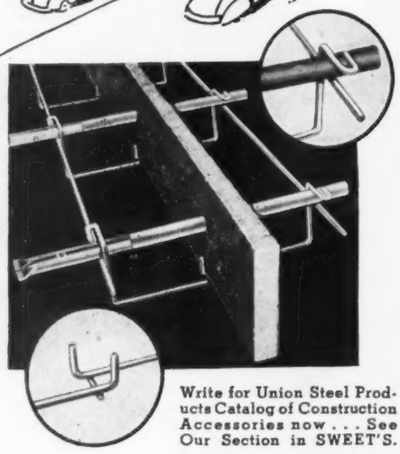
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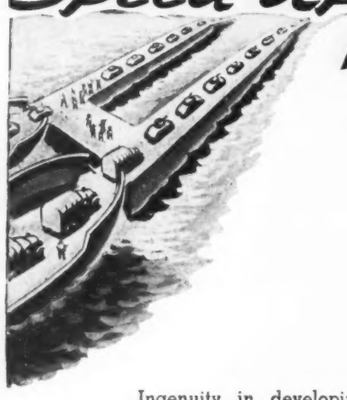
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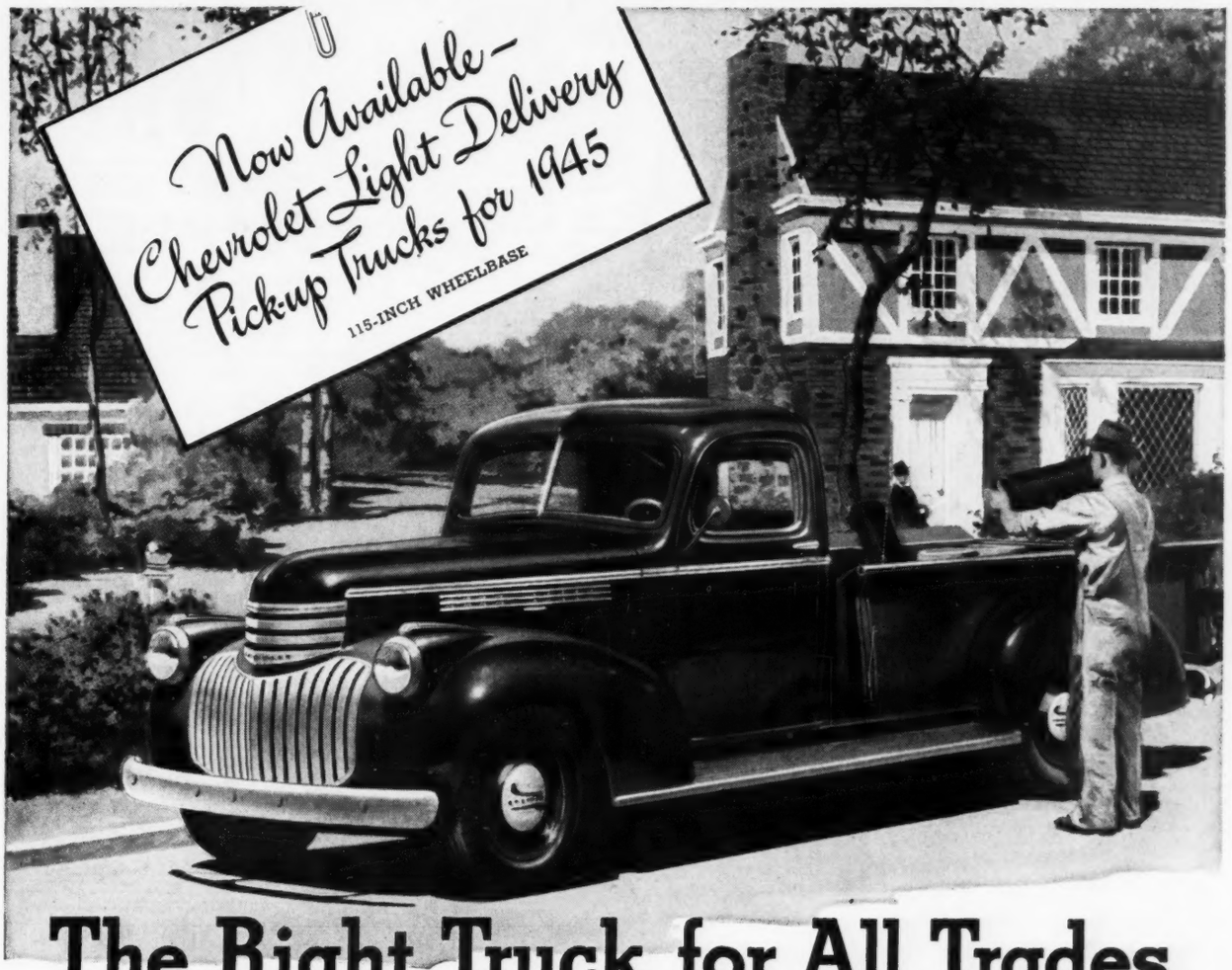
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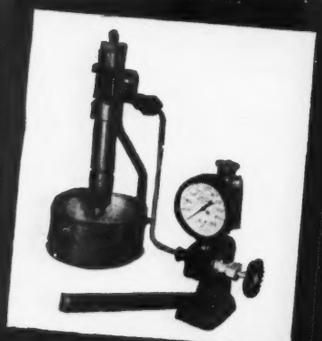
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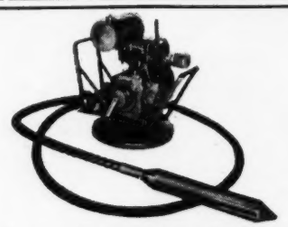
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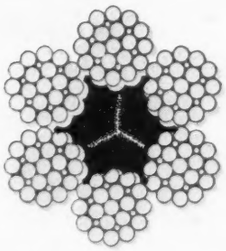
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